

## <abbrev> spec

Sort of a bad guy,  
because it has no explicit means to separate  
the rendered, abbreviated content from its expansion

- children:

TEXT, abbrev, alternatives, bold, chem-struct, def, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, ~~element-citation~~, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <abbrev-journal-title> spec

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

journal-title-group

## <abstract> spec

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, object-id, p, preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

app-group, article-meta, chem-struct-wrap, disp-formula, disp-formula-group, fig, fig-group, front-stub, graphic, media, sec-meta, statement, supplementary-material, table-wrap, table-wrap-group

## ~~<access-date>~~ spec

- ~~children:~~

~~TEXT, day, era, month, season, x, year~~

- ~~parents:~~

~~nlm-citation~~

## <ack> spec

- children:

~~ack~~, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, p, preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ~~ack~~, app, app-group, back, bio, body, boxed-text, disp-quote, front, glossary, ~~license-p~~, ~~named-content~~, notes, p, ref-list, sec, ~~styled-content~~, trans-abstract

## <addr-line> spec

This should be text-only.

Otherwise it is an invitation used it mixed with structural elements

- children:

TEXT, abbrev, alternatives, bold, chem-struct, **city**, **country**, email, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

address, aff, collab, conf-loc, corresp, publisher-loc

## <address> spec

- children:

addr-line, city, country, email, ext-link, fax, institution, institution-wrap, label, phone, postal-code, state, uri, x

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, collab, contrib, contrib-group, disp-quote, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <aff> spec

Avoid mixing structured and textual representation.  
Use <aff-alternatives> to provide a prerendered version  
via <x>

- children:

TEXT, abbrev, addr-line, alternatives, bold, break, chem-struct, city, country, email, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, label, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

aff-alternatives, article-meta, collab, contrib, contrib-group, front-stub, journal-meta, person-group, sig-block

## <aff-alternatives> spec

- children:

aff

- parents:

article-meta, collab, contrib, contrib-group, front-stub, journal-meta, person-group, sig-block

## <alt-text> spec

- children:

TEXT

- parents:

array, chem-struct, chem-struct-wrap, disp-formula, disp-formula-group, fig, fig-group, graphic, inline-graphic, inline-supplementary-material, media, preformat, supplementary-material, table-wrap, table-wrap-group

## <alt-title> spec

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

title-group

## <alternatives> spec

- children:

This is sort of a bad guy:

Used inline and block, without a good restriction on the allowed parent elements.

array, chem-struct, code, graphic, inline-graphic, inline-supplementary-material, media, preformat, private-char, supplementary-material, table, tex-math, textual-form

## Existence of <citation-alternatives> makes the selection of child content look a bit arbitrary

- parents:

abbrev, abbrev-journal-title, abstract, ack, addr-line, aff, **alt-title**, anonymous, app, app-group, array, article-title, attrib, award-id, bio, body, **bold**, boxed-text, chapter-title, chem-struct, chem-struct-wrap, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, disp-quote, edition, element-citation, email, etal, ext-link, fax, fig, fig-group, fixed-case, floats-group, funding-source, funding-statement, given-names, glossary, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, notes, on-behalf-of, **overline**, **p**, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, ref-list, related-article, related-object, role, roman, sans-serif, sc, sec, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, **strike**, string-conf, string-date, string-name, styled-content, **sub**, subject, subtitle, suffix, **sup**, supplementary-material, surname, table-wrap, target, td, term, term-head, th, title, trans-abstract, trans-source, trans-subtitle, trans-title, **underline**, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <annotation> spec

This seems to be in the wrong place when used for citations: adds extra information to the bibliographic-entry, no matter what representation  
Thus, it should be child of <ref> instead of <element-citation>

- children:

**p** Allow for more block-level types (e.g. lists)

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <anonymous> spec

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref **This is very unrestrictive**

- parents:

contrib, person-group

## <app> spec

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, p, permissions, preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

app-group

## <app-group> [spec](#)

- children:

abstract, ack, address, alternatives, app, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, graphic, kwd-group, label, list, media, p, preformat, ref-list, related-article, related-object, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

back

## <array> [spec](#)

- children:

alt-text, alternatives, attrib, email, ext-link, graphic, label, long-desc, media, permissions, tbody, uri

- parents:

abstract, ack, alternatives, app, app-group, bio, body, boxed-text, chem-struct, disp-formula, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, td, term, th, trans-abstract

## <article> [spec](#)

- children:

back, body, floats-group, front, response, sub-article

## <article-categories> [spec](#)

- children:

series-text, series-title, subj-group

- parents:

article-meta, front-stub

## <article-id> [spec](#)

- children:

TEXT

- parents:

## <article-meta> [spec](#)

- children:

abstract, aff, aff-alternatives, article-categories, article-id, author-notes, conference, contrib-group, counts, custom-meta-group, elocation-id, email, ext-link, fpage, funding-group, history, isbn, issue, issue-id, issue-part, issue-sponsor, issue-title, kwd-group, lpage, page-range, permissions, product, pub-date, related-article, related-object, self-uri, supplement, supplementary-material, title-group, trans-abstract, uri, volume, volume-id, volume-issue-group, volume-series, x

- parents:

front

## <article-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object, title-group

## <attrib> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

array, boxed-text, chem-struct-wrap, disp-formula, disp-quote, fig, graphic, media, preformat, statement, supplementary-material, table-wrap, table-wrap-foot, verse-group

## <author-comment> [spec](#)

- children:

p, title

- parents:

collab, contrib, contrib-group

## <author-notes> [spec](#)

- children:  
corresp, fn, label, p, title, x
- parents:  
article-meta, front-stub

## <award-group> [spec](#)

- children:  
award-id, funding-source, principal-award-recipient, principal-investigator
- parents:  
funding-group

## <award-id> [spec](#)

- children:  
TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref
- parents:  
award-group, funding-statement, license-p, p

## <back> [spec](#)

- children:  
ack, app-group, bio, fn-group, glossary, label, notes, ref-list, sec, title
- parents:  
article, response, sub-article

## <bio> [spec](#)

- children:  
ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, p,

preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

back, collab, contrib, contrib-group, front

## <body> [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, graphic, list, media, p, preformat, related-article, related-object, sec, sig-block, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, verse-group, x

- parents:

article, response, sub-article

## <bold> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <boxed-text> [spec](#)

- children:

ack, address, alternatives, array, attrib, boxed-text, caption, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, object-id, p, permissions, preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, verse-group, x



- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <break> [spec](#)

- parents:

aff, alt-title, article-title, attrib, bold, chapter-title, chem-struct, collab, compound-kwd-part, corresp, disp-formula, fixed-case, history, institution, italic, kwd, label, monospace, overline, part-title, product, publisher-loc, related-article, related-object, roman, sans-serif, sc, sig, sig-block, source, std-organization, strike, sub, subject, subtitle, sup, target, td, th, title, trans-source, trans-subtitle, trans-title, underline, xref

## <caption> [spec](#)

- children:

**p**, title Should allow for more block-level types

- parents:

boxed-text, chem-struct-wrap, disp-formula-group, fig, fig-group, graphic, media, supplementary-material, table-wrap, table-wrap-group

## <chapter-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <chem-struct> [spec](#)

- children:

TEXT, abbrev, alt-text, alternatives, array, bold, break, chem-struct, code, def-list, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, label, list, long-desc, media, milestone-end, milestone-start, monospace, named-content, object-id, overline, overline-end, overline-start, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, alternatives, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, chem-struct-wrap, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <chem-struct-wrap> [spec](#)

- children:

abstract, alt-text, alternatives, attrib, caption, chem-struct, code, email, ext-link, graphic, kwd-group, label, long-desc, media, object-id, permissions, preformat, textual-form, uri

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, td, term, th, trans-abstract

## <citation-alternatives> [spec](#)

- children:

element-citation, mixed-citation, ~~nlm-citation~~

- parents:

~~license-p, p, ref, td, th, title~~

## <city> [spec](#)

- children:

TEXT

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## <code> [spec](#)

- children:

TEXT, abbrev, bold, email, ext-link, fixed-case, fn, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, roman, ruby, sans-serif, sc, strike, styled-content,

sub, sup, target, underline, underline-end, underline-start, uri, xref

- parents:

abstract, ack, alternatives, app, app-group, bio, body, boxed-text, chem-struct, chem-struct-wrap, disp-formula, disp-quote, fig, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, td, term, th, trans-abstract

## **<col>** [spec](#)

- parents:

colgroup, table

## **<colgroup>** [spec](#)

- children:

col

## **<collab>** [spec](#)

- children:

TEXT, abbrev, addr-line, address, aff, aff-alternatives, alternatives, author-comment, bio, bold, break, chem-struct, city, contrib-group, country, email, etal, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, on-behalf-of, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, role, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

collab-alternatives, contrib, element-citation, mixed-citation, nlm-citation, person-group, product, related-article, related-object

## **<collab-alternatives>** [spec](#)

- children:

collab

- parents:

contrib, element-citation, mixed-citation, person-group, product, related-article, related-object

## **<comment>** [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-

content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <compound-kwd> [spec](#)

- children:

compound-kwd-part

- parents:

kwd-group, nested-kwd

## <compound-kwd-part> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

compound-kwd

## <compound-subject> [spec](#)

- children:

compound-subject-part

- parents:

subj-group

## <compound-subject-part> [spec](#)

- children:

TEXT, alternatives, bold, chem-struct, fixed-case, inline-formula, inline-graphic, italic, monospace, named-content, overline, overline-end, overline-start, private-char, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, underline, underline-end, underline-start

- parents:

compound-subject

## <conf-acronym> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, element-citation, mixed-citation, product, related-article, related-object, string-conf

## <conf-date> [spec](#)

- children:

TEXT, day, era, month, season, x, year

- parents:

conference, element-citation, mixed-citation, nlm-citation, product, related-article, related-object, string-conf

## <conf-loc> [spec](#)

- children:

TEXT, abbrev, addr-line, alternatives, bold, chem-struct, city, country, email, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, element-citation, mixed-citation, nlm-citation, product, related-article, related-object, string-conf

## <conf-name> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, element-citation, mixed-citation, nlm-citation, product, related-article, related-object, string-conf

## <conf-num> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, string-conf

## <conf-sponsor> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, element-citation, mixed-citation, product, related-article, related-object, string-conf

## <conf-theme> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, string-conf

## <conference> [spec](#)

- children:

conf-acronym, conf-date, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, string-conf, x

- parents:

article-meta, front-stub

## <contrib> [spec](#)

- children:

address, aff, aff-alternatives, anonymous, author-comment, bio, collab, collab-alternatives, contrib-id, degrees, email, etal, ext-link, fn, name, name-alternatives, on-behalf-of, role, string-name, uri, x, xref

- parents:

contrib-group, sig-block

## <contrib-group> [spec](#)

- children:

address, aff, aff-alternatives, author-comment, bio, contrib, email, etal, ext-link, fn, on-behalf-of, role, uri, x, xref

- parents:

article-meta, collab, front-stub, journal-meta, sec-meta, supplement

## <contrib-id> [spec](#)

- children:

TEXT

- parents:

contrib, principal-award-recipient, principal-investigator

## <copyright-holder> [spec](#)

- children:

TEXT, institution, institution-wrap, sub, sup, x

- parents:

permissions

## <copyright-statement> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby,

sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

permissions

## <copyright-year> [spec](#)

- children:

TEXT

- parents:

permissions

## <corresp> [spec](#)

- children:

TEXT, abbrev, addr-line, alternatives, bold, break, chem-struct, city, country, email, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, label, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

author-notes

## <count> [spec](#)

- parents:

counts

## <country> [spec](#)

- children:

TEXT, x

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## <counts> [spec](#)

- children:



count, equation-count, fig-count, page-count, ref-count, table-count, word-count

- parents:

article-meta, front-stub

## <custom-meta> [spec](#)

- children:

meta-name, meta-value

- parents:

custom-meta-group

## <custom-meta-group> [spec](#)

- children:

custom-meta

- parents:

article-meta, front-stub, journal-meta

## <data-title> [spec](#)

- children:

TEXT, bold, email, ext-link, fixed-case, italic, monospace, named-content, overline, overline-end, overline-start, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, underline, underline-end, underline-start, uri

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <date> [spec](#)

- children:

day, era, month, season, string-date, year

- parents:

element-citation, history, mixed-citation, product, related-article, related-object

## <date-in-citation> [spec](#)

- children:

TEXT, bold, day, era, fixed-case, italic, monospace, month, overline, overline-end, overline-start, roman, ruby, sans-serif, sc, season, strike, underline, underline-end, underline-start, x, year

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <day> [spec](#)

- children:

TEXT

- parents:

access-date, conf-date, date, date-in-citation, element-citation, mixed-citation, nlm-citation, product, pub-date, related-article, related-object, std, string-date, time-stamp

## <def> [spec](#)

- children:

p

- parents:

abbrev, def-item

## <def-head> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

def-list

## <def-item> [spec](#)

- children:

def, label, term, x

- parents:

def-list

## <def-list> [spec](#)

- children:

def-head, def-item, def-list, label, term-head, title, x

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, chem-struct, def-list, disp-quote, fig, front, glossary, license-p, list-item, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, td, th, trans-abstract

## <degrees> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

contrib, speaker, string-name

## <disp-formula> [spec](#)

- children: **Do not mix textual and structured content here**

**TEXT**, abbrev, abstract, alt-text, alternatives, array, attrib, bold, break, chem-struct, code, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, kwd-group, label, long-desc, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, permissions, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-formula-group, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, td, term, th, trans-abstract

## <disp-formula-group> [spec](#)

- children:

abstract, alt-text, caption, disp-formula, disp-formula-group, email, ext-link, kwd-group, label, long-desc, uri

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-formula-group, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, td, term, th, trans-abstract

## <disp-quote> [spec](#)

- children:

ack, address, alternatives, array, attrib, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, graphic, label, list, media, p, permissions, preformat, related-article, related-object, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, trans-abstract

## <edition> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <element-citation> [spec](#)

- children:

abbrev, alternatives, annotation, article-title, bold, chapter-title, chem-struct, collab, collab-alternatives, comment, conf-acronym, conf-date, conf-loc, conf-name, conf-sponsor, data-title, date, date-in-citation, day, edition, elocation-id, email, etal, ext-link, fixed-case, fn, fpage, gov, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, isbn, issn, issn-l, issue, issue-id, issue-part, issue-title, italic, label, lpage, milestone-end, milestone-start, monospace, month, name, name-alternatives, named-content, object-id, overline, overline-end, overline-start, page-range, part-title, patent, person-group, private-char, pub-id, publisher-loc, publisher-name, related-article, related-object, role, roman, ruby, sans-serif, sc, season, series, size, source, std, strike, string-date, string-name, styled-content, sub, sup, supplement, target, tex-math, trans-source, trans-title, underline, underline-end, underline-start, uri, version, volume, volume-id, volume-series, x, xref, year

- parents:

citation-alternatives, license-p, p, ref, td, th, title

## <elocation-id> [spec](#)

- children:

TEXT

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object

## <email> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, address, aff, alt-title, anonymous, array, article-meta, article-title, attrib, award-id, bold, chapter-title, chem-struct, chem-struct-wrap, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, contrib, contrib-group, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, disp-formula-group, edition, element-citation, email, etal, ext-link, fax, fig, fig-group, fixed-case, front-stub, funding-source, funding-statement, given-names, gov, graphic, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, media, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, supplementary-material, surname, table-wrap, table-wrap-group, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <equation-count> [spec](#)

- parents:

counts

## <era> [spec](#)

- children:

TEXT

- parents:

access-date, conf-date, date, date-in-citation, pub-date, string-date, time-stamp

## <etal> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

collab, contrib, contrib-group, element-citation, mixed-citation, person-group, product, related-article, related-object, sig-block

## <ext-link> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, address, aff, alt-title, anonymous, array, article-meta, article-title, attrib, award-id, bold, chapter-title, chem-struct, chem-struct-wrap, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, contrib, contrib-group, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, disp-formula-group, edition, element-citation, email, etal, ext-link, fax, fig, fig-group, fixed-case, front-stub, funding-source, funding-statement, given-names, gov, graphic, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, media, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, supplementary-material, surname, table-wrap, table-wrap-group, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <fax> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## <fig> [spec](#)

- children:

abstract, alt-text, alternatives, array, attrib, caption, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, email, ext-link, graphic, kwd-group, label, list, long-desc, media, object-id, p, permissions, preformat, speech, statement, table-wrap, uri, verse-group

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig-group, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <fig-count> [spec](#)

- parents:

counts

## <fig-group> [spec](#)

- children:

abstract, alt-text, alternatives, caption, email, ext-link, fig, graphic, kwd-group, label, long-desc, media, uri

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <fixed-case> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf,

string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <floats-group> [spec](#)

- children:

alternatives, boxed-text, chem-struct-wrap, code, fig, fig-group, graphic, media, preformat, supplementary-material, table-wrap, table-wrap-group

- parents:

article, response, sub-article

## <fn> [spec](#)

- children:

label, p

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, author-notes, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, contrib, contrib-group, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, fn-group, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, table-wrap-foot, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <fn-group> [spec](#)

- children:

fn, label, title, x

- parents:

abstract, ack, app, back, bio, boxed-text, front, notes, sec, table-wrap-foot, title-group, trans-abstract

## <fpage> [spec](#)

- children:

TEXT



- parents:

article-meta, element-citation, front-stub, mixed-citation, nlm-citation, product, related-article, related-object

## <front> [spec](#)

- children:

ack, article-meta, bio, def-list, fn-group, glossary, journal-meta, list, notes

- parents:

article, response, sub-article

## <front-stub> [spec](#)

- children:

abstract, aff, aff-alternatives, article-categories, article-id, author-notes, conference, contrib-group, counts, custom-meta-group, elocation-id, email, ext-link, fpage, funding-group, history, isbn, issue, issue-id, issue-part, issue-sponsor, issue-title, kwd-group, lpage, page-range, permissions, product, pub-date, related-article, related-object, self-uri, supplement, supplementary-material, title-group, trans-abstract, uri, volume, volume-id, volume-issue-group, volume-series, x

- parents:

response, sub-article

## <funding-group> [spec](#)

- children:

award-group, funding-statement, open-access

- parents:

article-meta, front-stub

## <funding-source> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

award-group, funding-statement, license-p, p

## <funding-statement> [spec](#)

- children:

TEXT, abbrev, alternatives, award-id, bold, chem-struct, email, ext-link, fixed-case, fn, funding-source, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, open-access, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

funding-group

## <given-names> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

name, speaker, string-name

## <glossary> [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, glossary, graphic, label, list, media, p, preformat, related-article, related-object, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ack, app, back, bio, boxed-text, front, glossary, notes, sec, trans-abstract

## <glyph-data> [spec](#)

- children:

TEXT

- parents:

private-char

## <glyph-ref> [spec](#)

- parents:

private-char

## <gov> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <graphic> [spec](#)

- children:

abstract, alt-text, attrib, caption, email, ext-link, kwd-group, label, long-desc, object-id, permissions, uri

- parents:

abstract, ack, alternatives, app, app-group, array, bio, body, boxed-text, chem-struct, chem-struct-wrap, disp-formula, disp-quote, fig, fig-group, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, sig, sig-block, styled-content, supplementary-material, table-wrap, td, term, th, trans-abstract

## <history> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, date, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, string-date, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, front-stub

## <hr> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement,

given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <inline-formula> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <inline-graphic> [spec](#)

- children:

alt-text

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, alternatives, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, private-char, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-

head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <inline-supplementary-material> [spec](#)

- children:

TEXT, abbrev, alt-text, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, long-desc, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, alternatives, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <institution> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

addr-line, address, aff, collab, conf-loc, conf-sponsor, copyright-holder, corresp, element-citation, funding-source, institution-wrap, mixed-citation, on-behalf-of, principal-award-recipient, product, publisher-loc, publisher-name, related-article, related-object, std-organization

## <institution-id> [spec](#)

- children:

TEXT

- parents:

institution-wrap

## <institution-wrap> [spec](#)

- children:

institution, institution-id

- parents:

addr-line, address, aff, collab, conf-loc, conf-sponsor, copyright-holder, corresp, element-citation, funding-source, mixed-citation, on-behalf-of, principal-award-recipient, product, publisher-loc, publisher-name, related-article, related-object, std-organization

## <isbn> [spec](#)

- children:

TEXT, x

- parents:

article-meta, element-citation, front-stub, journal-meta, mixed-citation, product, related-article, related-object

## <issn> [spec](#)

- children:

TEXT, x

- parents:

element-citation, journal-meta, mixed-citation, product, related-article, related-object

## <issn-l> [spec](#)

- children:

TEXT, x

- parents:

element-citation, journal-meta, mixed-citation, product, related-article, related-object

## <issue> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, nlm-citation, product, related-article, related-object, volume-issue-group

## <issue-id> [spec](#)

- children:

TEXT

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object, volume-issue-group

## <issue-part> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object, volume-issue-group

## <issue-sponsor> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, front-stub, volume-issue-group

## <issue-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby,

sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object, volume-issue-group

## <italic> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <journal-id> [spec](#)

- children:

TEXT

- parents:

journal-meta, related-article

## <journal-meta> [spec](#)

- children:

aff, aff-alternatives, contrib-group, custom-meta-group, isbn, issn, issn-l, journal-id, journal-title-group, notes, publisher, self-uri

- parents:

front



## <journal-subtitle> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

journal-title-group

## <journal-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

journal-title-group

## <journal-title-group> [spec](#)

- children:

abbrev-journal-title, journal-subtitle, journal-title, trans-title-group

- parents:

journal-meta

## <kwd> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

kwd-group, nested-kwd

## <kwd-group> [spec](#)

- children:

compound-kwd, kwd, label, nested-kwd, title, unstructured-kwd-group, x

- parents:

app-group, article-meta, chem-struct-wrap, disp-formula, disp-formula-group, fig, fig-group, front-stub, graphic, media, sec-meta, statement, supplementary-material, table-wrap, table-wrap-group

## <label> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abstract, ack, address, aff, app, app-group, array, author-notes, back, bio, boxed-text, chem-struct, chem-struct-wrap, corresp, def-item, def-list, disp-formula, disp-formula-group, disp-quote, element-citation, fig, fig-group, fn, fn-group, glossary, graphic, kwd-group, list, list-item, media, mixed-citation, note, notes, product, ref, ref-list, related-article, related-object, sec, statement, supplementary-material, table-wrap, table-wrap-foot, table-wrap-group, textual-form, trans-abstract, verse-group

## <license> [spec](#)

- children:

license-p

- parents:

permissions

## <license-p> [spec](#)

- children:

Phrasing content only

TEXT, abbrev, ack, address, alternatives, array, award-id, bold, boxed-text, chem-struct, chem-struct-wrap, citation-alternatives, code, def-list, disp-formula, disp-formula-group, disp-quote, element-citation, email, ext-link, fig, fig-group, fixed-case, fn, funding-source, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, list, media, milestone-end, milestone-start, mixed-citation, monospace, named-content, nlm-citation, open-access, overline, overline-end, overline-start, preformat, price, private-char, related-article, related-object, roman, ruby, sans-serif, sc, speech, statement, strike, styled-content, sub, sup, supplementary-material, table-wrap, table-wrap-group, target, tex-math, underline, underline-end, underline-start, uri, verse-group, x, xref

- parents:

license

## **<list>** [spec](#)

- children:

label, list-item, title, x

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, chem-struct, disp-quote, fig, front, glossary, license-p, list-item, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, td, th, trans-abstract

## **<list-item>** [spec](#)

- children:

def-list, label, list, p, title

- parents:

list

## **<long-desc>** [spec](#)

- children:

TEXT, x

- parents:

array, chem-struct, chem-struct-wrap, disp-formula, disp-formula-group, fig, fig-group, graphic, inline-supplementary-material, media, preformat, supplementary-material, table-wrap, table-wrap-group

## **<lpage>** [spec](#)

- children:

TEXT

- parents:

article-meta, element-citation, front-stub, mixed-citation, nlm-citation, product, related-article, related-object

## **<media>** [spec](#)

- children:

abstract, alt-text, attrib, caption, email, ext-link, kwd-group, label, long-desc, object-id, permissions, uri

- parents:

abstract, ack, alternatives, app, app-group, array, bio, body, boxed-text, chem-struct, chem-struct-wrap, disp-formula, disp-quote, fig, fig-group, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, sig, sig-block, styled-content, supplementary-material, table-wrap, td, term, th, trans-abstract

## <meta-name> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

custom-meta

## <meta-value> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

custom-meta

## <milestone-end> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <milestone-start> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <mixed-citation> [spec](#)

- children:

TEXT, abbrev, alternatives, annotation, article-title, bold, chapter-title, chem-struct, collab, collab-alternatives, comment, conf-acronym, conf-date, conf-loc, conf-name, conf-sponsor, data-title, date, date-in-citation, day, edition, elocation-id, email, etal, ext-link, fixed-case, fn, fpage, gov, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, isbn, issn, issn-l, issue, issue-id, issue-part, issue-title, italic, label, lpage, milestone-end, milestone-start, monospace, month, name, name-alternatives, named-content, object-id, overline, overline-end, overline-start, page-range, part-title, patent, person-group, private-char, pub-id, publisher-loc, publisher-name, related-article, related-object, role, roman, ruby, sans-serif, sc, season, series, size, source, std, strike, string-date, string-name, styled-content, sub, sup, supplement, target, tex-math, trans-source, trans-title, underline, underline-end, underline-start, uri, version, volume, volume-id, volume-series, x, xref, year

- parents:

citation-alternatives, license-p, p, ref, td, th, title

## <monospace> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri,

series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <month> [spec](#)

- children:

TEXT

- parents:

access-date, conf-date, date, date-in-citation, element-citation, mixed-citation, nlm-citation, product, pub-date, related-article, related-object, std, string-date, time-stamp

## <name> [spec](#)

- children:

given-names, prefix, suffix, surname

- parents:

contrib, element-citation, mixed-citation, name-alternatives, person-group, principal-award-recipient, principal-investigator, product, related-article, related-object

## <name-alternatives> [spec](#)

- children:

name, string-name

- parents:

contrib, element-citation, mixed-citation, person-group, principal-award-recipient, principal-investigator, product, related-article, related-object

## <named-content> [spec](#)

Phrasing content only  
This is an annotation

- children:

TEXT, abbrev, ack, address, alternatives, array, bold, boxed-text, chem-struct, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, email, ext-link, fig, fig-group, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, list, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, speech, statement, strike, styled-content, sub, sup, supplementary-material, table-wrap, table-wrap-group, target, tex-math, underline, underline-end, underline-start, uri, verse-group, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <nested-kwd> [spec](#)

- children:

compound-kwd, kwd, nested-kwd

- parents:

kwd-group, nested-kwd

## <nlm-citation> [spec](#)

- children:

access-date, annotation, article-title, collab, comment, conf-date, conf-loc, conf-name, day, edition, fpage, issue, lpage, month, page-count, patent, person-group, pub-id, publisher-loc, publisher-name, season, series, source, supplement, time-stamp, trans-source, trans-title, volume, year

- parents:

citation-alternatives, license-p, p, ref, td, th, title

## <note> [spec](#)

- children:

label, p, product

- parents:

ref

## <notes> [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, p,

preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ack, app, back, bio, boxed-text, front, journal-meta, notes, sec, trans-abstract

## <object-id> [spec](#)

- children:

TEXT

- parents:

abstract, boxed-text, chem-struct, chem-struct-wrap, element-citation, fig, graphic, media, mixed-citation, product, related-article, related-object, supplementary-material, table-wrap, trans-abstract

## <on-behalf-of> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

collab, contrib, contrib-group

## <open-access> [spec](#)

- children:

p

- parents:

funding-group, funding-statement, license-p, p

## <overline> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:



abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <overline-end> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <overline-start> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <p> [spec](#) Phrasing content only

- children:

TEXT, abbrev, **ack**, **address**, **alternatives**, **array**, **award-id**, **bold**, **boxed-text**, chem-struct, **chem-struct-wrap**, **citation-alternatives**, **code**, **def-list**, **disp-formula**, **disp-formula-group**, **disp-quote**, **element-citation**, **email**, ext-link, **fig**, **fig-group**, fixed-case, **fn**, **funding-source**, **graphic**, **hr**, inline-formula, inline-graphic, inline-supplementary-material, italic, **list**, **media**, milestone-end, milestone-start, **mixed-citation**, monospace, named-content, **nlm-citation**, **open-access**, overline, overline-end, overline-start, preformat, private-char, **related-article**, **related-object**, roman, ruby, sans-serif, sc, **speech**, **statement**, strike, styled-content, sub, sup, **supplementary-material**, **table-wrap**, **table-wrap-group**, **target**, **tex-math**, underline, underline-end, underline-start, **uri**, **verse-group**, x, xref

- parents:

abstract, ack, annotation, app, app-group, author-comment, author-notes, bio, body, boxed-text, caption, def, disp-quote, fig, fn, glossary, list-item, note, notes, open-access, ref-list, sec, speech, statement, supplementary-material, table-wrap-foot, td, th, trans-abstract

## <page-count> [spec](#)

- parents:

counts, nlm-citation

## <page-range> [spec](#)

- children:

TEXT

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object

## <part-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <patent> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby,

sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <permissions> [spec](#)

- children:

copyright-holder, copyright-statement, copyright-year, license

- parents:

app, array, article-meta, boxed-text, chem-struct-wrap, disp-formula, disp-quote, fig, front-stub, graphic, media, preformat, sec-meta, statement, supplementary-material, table-wrap, table-wrap-foot, verse-group

## <person-group> [spec](#)

- children:

TEXT, aff, aff-alternatives, anonymous, collab, collab-alternatives, etal, name, name-alternatives, role, string-name, x

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <phone> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## <postal-code> [spec](#)

- children:

TEXT

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## <prefix> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

name, speaker, string-name

## <preformat> [spec](#)

- children:

TEXT, abbrev, alt-text, alternatives, attrib, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, long-desc, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, permissions, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abstract, ack, alternatives, app, app-group, bio, body, boxed-text, chem-struct, chem-struct-wrap, disp-formula, disp-quote, fig, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, td, term, th, trans-abstract

## <price> [spec](#)

- children:

TEXT, bold, fixed-case, italic, monospace, overline, overline-end, overline-start, roman, ruby, sans-serif, sc, strike, underline, underline-end, underline-start

- parents:

license-p, product

## <principal-award-recipient> [spec](#)

- children:

TEXT, contrib-id, institution, institution-wrap, name, name-alternatives, string-name

- parents:

award-group

## <principal-investigator> [spec](#)

- children:

TEXT, contrib-id, name, name-alternatives, string-name

- parents:

award-group

## <private-char> [spec](#)

- children:

glyph-data, glyph-ref, inline-graphic

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, alternatives, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <product> [spec](#)

There is no means to separate  
textual and structured representation

- children:

TEXT, abbrev, alternatives, annotation, article-title, bold, break, chapter-title, chem-struct, collab, collab-alternatives, comment, conf-acronym, conf-date, conf-loc, conf-name, conf-sponsor, data-title, date, date-in-citation, day, edition, elocation-id, email, etal, ext-link, fixed-case, fn, fpage, gov, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, isbn, issn, issn-l, issue, issue-id, issue-part, issue-title, italic, label, lpage, milestone-end, milestone-start, monospace, month, name, name-alternatives, named-content, object-id, overline, overline-end, overline-start, page-range, part-title, patent, person-group, price, private-char, pub-id, publisher-loc, publisher-name, related-article, related-object, role, roman, ruby, sans-serif, sc, season, series, size, source, std, strike, string-date, string-name, styled-content, sub, sup, supplement, target, tex-math, trans-source, trans-title, underline, underline-end, underline-start, uri, version, volume, volume-id, volume-series, x, xref, year

- parents:

article-meta, front-stub, note

## <pub-date> [spec](#)

- children:

day, era, month, season, string-date, x, year

- parents:

article-meta, front-stub

## <pub-id> [spec](#)

- children:

TEXT

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object, std

## <publisher> [spec](#)

- children:

publisher-loc, publisher-name

- parents:

journal-meta

## <publisher-loc> [spec](#)

- children:

TEXT, abbrev, addr-line, alternatives, bold, break, chem-struct, city, country, email, ext-link, fax, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, phone, postal-code, private-char, related-article, related-object, roman, ruby, sans-serif, sc, state, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, publisher, related-article, related-object

## <publisher-name> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, publisher, related-article, related-object

## **<rb>** [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

ruby

## **<ref>** [spec](#)

- children:

citation-alternatives, element-citation, label, mixed-citation, nlm-citation, note, x

- parents:

ref-list

## **<ref-count>** [spec](#)

- parents:

counts

## **<ref-list>** [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, graphic, label, list, media, p, preformat, ref, ref-list, related-article, related-object, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ack, app, app-group, back, bio, boxed-text, notes, ref-list, sec, trans-abstract

## **<related-article>** [spec](#)

- children:

TEXT, abbrev, alternatives, annotation, article-title, bold, break, chapter-title, chem-struct, collab, collab-alternatives, comment, conf-acronym, conf-date, conf-loc, conf-name, conf-sponsor, data-title, date, date-in-citation, day, edition, elocation-id, email, etal, ext-link, fixed-case, fn, fpage, gov, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, isbn, issn, issn-l, issue, issue-id, issue-part, issue-title, italic, journal-id, label, lpage, milestone-end, milestone-

JATS allows this as inline-node.  
Defining it e.g. in <article-meta> and  
referencing it with <xref>  
would be more consistent

start, monospace, month, name, name-alternatives, named-content, object-id, overline, overline-end, overline-start, page-range, part-title, patent, person-group, private-char, pub-id, publisher-loc, publisher-name, related-article, related-object, role, roman, ruby, sans-serif, sc, season, series, size, source, std, strike, string-date, string-name, styled-content, sub, sup, supplement, target, tex-math, trans-source, trans-title, underline, underline-end, underline-start, uri, version, volume, volume-id, volume-series, x, xref, year

- parents:

abbrev, abbrev-journal-title, abstract, ack, addr-line, aff, alt-title, anonymous, app, app-group, article-meta, article-title, attrib, award-id, bio, body, bold, boxed-text, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, disp-quote, edition, element-citation, email, etal, ext-link, fax, fixed-case, front-stub, funding-source, funding-statement, given-names, glossary, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, notes, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, ref-list, related-article, related-object, role, roman, sans-serif, sc, sec, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-abstract, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

JATS allows this as inline-node.

**<related-object>** spec Defining it e.g. in <article-meta> and referencing it with <xref> would be more consistent

- children:

TEXT, abbrev, alternatives, annotation, article-title, bold, break, chapter-title, chem-struct, collab, collab-alternatives, comment, conf-acronym, conf-date, conf-loc, conf-name, conf-sponsor, data-title, date, date-in-citation, day, edition, elocation-id, email, etal, ext-link, fixed-case, fn, fpage, gov, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, isbn, issn, issn-l, issue, issue-id, issue-part, issue-title, italic, label, lpage, milestone-end, milestone-start, monospace, month, name, name-alternatives, named-content, object-id, overline, overline-end, overline-start, page-range, part-title, patent, person-group, private-char, pub-id, publisher-loc, publisher-name, related-article, related-object, role, roman, ruby, sans-serif, sc, season, series, size, source, std, strike, string-date, string-name, styled-content, sub, sup, supplement, target, tex-math, trans-source, trans-title, underline, underline-end, underline-start, uri, version, volume, volume-id, volume-series, x, xref, year

- parents:

abbrev, abbrev-journal-title, abstract, ack, addr-line, aff, alt-title, anonymous, app, app-group, article-meta, article-title, attrib, award-id, bio, body, bold, boxed-text, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, disp-quote, edition, element-citation, email, etal, ext-link, fax, fixed-case, front-stub, funding-source, funding-statement, given-names, glossary, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, notes, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, ref-list, related-article, related-object, role, roman, sans-serif, sc, sec, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-abstract, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref



## **<response>** [spec](#)

- children:  
back, body, floats-group, front, front-stub
- parents:  
article, sub-article

## **<role>** [spec](#)

- children:  
TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref
- parents:  
collab, contrib, contrib-group, element-citation, mixed-citation, person-group, product, related-article, related-object, sig-block

## **<roman>** [spec](#)

- children:  
TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref
- parents:  
abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## **<rp>** [spec](#)

- children:

TEXT

- parents:

ruby

## <rt> [spec](#)

- children:

TEXT

- parents:

ruby

## <ruby> [spec](#)

- children:

rb, rp, rt

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <sans-serif> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp,

data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <sc> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <season> [spec](#)

- children:

TEXT

- parents:

access-date, conf-date, date, date-in-citation, element-citation, mixed-citation, nlm-citation, product, pub-date, related-article, related-object, string-date, time-stamp

## <sec> [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, p,

preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

abstract, ack, app, back, bio, body, boxed-text, notes, sec, trans-abstract

## <sec-meta> [spec](#)

- children:

abstract, contrib-group, kwd-group, permissions

- parents:

abstract, ack, app, bio, boxed-text, notes, sec, trans-abstract

## <self-uri> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, front-stub, journal-meta

## <series> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <series-text> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby,

sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-categories

## <series-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-categories

## <sig> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

sig-block

## <sig-block> [spec](#)

- children:

TEXT, abbrev, aff, aff-alternatives, alternatives, bold, break, chem-struct, contrib, email, etal, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, role, roman, ruby, sans-serif, sc, sig, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

body

## <size> [spec](#)

- children:

TEXT, x

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <source> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object, std

## <speaker> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, degrees, email, ext-link, fixed-case, fn, given-names, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, prefix, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, suffix, sup, surname, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

speech

## <speech> [spec](#)

- children:

p, speaker

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, trans-abstract

## <state> [spec](#)

- children:

TEXT

- parents:

addr-line, address, aff, collab, conf-loc, corresp, publisher-loc

## **<statement>** [spec](#)

- children:

abstract, attrib, kwd-group, label, p, permissions, statement, title

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, statement, styled-content, supplementary-material, table-wrap, trans-abstract

## **<std>** [spec](#)

- children:

TEXT, bold, day, fixed-case, italic, monospace, month, named-content, overline, overline-end, overline-start, pub-id, roman, ruby, sans-serif, sc, source, std-organization, strike, styled-content, sub, sup, underline, underline-end, underline-start, year

- parents:

element-citation, mixed-citation, product, related-article, related-object

## **<std-organization>** [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, institution, institution-wrap, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

std

## **<strike>** [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-

acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <string-conf> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, conf-acronym, conf-date, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, string-conf, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

conference, string-conf

## <string-date> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, day, email, era, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, month, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, season, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref, year

- parents:

date, element-citation, history, mixed-citation, product, pub-date, related-article, related-object

## <string-name> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, degrees, email, ext-link, fixed-case, fn, given-names, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, prefix, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, suffix, sup, surname, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:



contrib, element-citation, mixed-citation, name-alternatives, person-group, principal-award-recipient, principal-investigator, product, related-article, related-object

## **<styled-content>** spec

This is a self-contained inline node  
Phrasing content only

- children:

TEXT, abbrev, ack, address, alternatives, array, bold, boxed-text, chem-struct, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, email, ext-link, fig, fig-group, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, list, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, speech, statement, strike, styled-content, sub, sup, supplementary-material, table-wrap, table-wrap-group, target, tex-math, underline, underline-end, underline-start, uri, verse-group, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## **<sub>** spec

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-holder, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term,

term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <sub-article> [spec](#)

- children:  
back, body, floats-group, front, front-stub, response, sub-article
- parents:  
article, sub-article

## <subj-group> [spec](#)

- children:  
compound-subject, subj-group, subject
- parents:  
article-categories, subj-group

## <subject> [spec](#)

- children:  
TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref
- parents:  
subj-group

## <subtitle> [spec](#)

- children:  
TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref
- parents:  
title-group, verse-group

## <suffix> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

name, speaker, string-name

## <sup> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-holder, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <supplement> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, contrib-group, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, title, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, nlm-citation, product, related-article, related-object

## <supplementary-material> [spec](#)

- children:

abstract, alt-text, alternatives, array, attrib, caption, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, email, ext-link, graphic, kwd-group, label, list, long-desc, media, object-id, p, permissions, preformat, speech, statement, table-wrap, uri, verse-group

- parents:

abstract, ack, alternatives, app, app-group, article-meta, bio, body, boxed-text, disp-quote, floats-group, front-stub, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <surname> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

name, speaker, string-name

## <table> [spec](#)

- children:

col, tbody, tfoot, thead, tr

- parents:

alternatives, table-wrap

## <table-count> [spec](#)

- parents:

counts

## <table-wrap> [spec](#)

- children:

abstract, alt-text, alternatives, attrib, caption, chem-struct-wrap, code, def-list, disp-quote, email, ext-link, graphic, kwd-group, label, list, long-desc, media, object-id, permissions, preformat, speech, statement, table, table-wrap-foot, uri, verse-group

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap-group, trans-

abstract

## <table-wrap-foot> [spec](#)

- children:

attrib, fn, fn-group, label, p, permissions, title, x

- parents:

table-wrap

## <table-wrap-group> [spec](#)

- children:

abstract, alt-text, caption, email, ext-link, kwd-group, label, long-desc, table-wrap, uri

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, floats-group, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, trans-abstract

## <target> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <tbody> [spec](#)

- children:

tr

- parents:

array, table

**<td>** spec

In Texture we want to model <td> as container  
I.e., it does not have 'mixed' content

- children:

TEXT, abbrev, alternatives, array, bold, break, chem-struct, chem-struct-wrap, citation-alternatives, code, def-list, disp-formula, disp-formula-group, element-citation, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, list, media, milestone-end, milestone-start, mixed-citation, monospace, named-content, nlm-citation, overline, overline-end, overline-start, p, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

tr

**<term>** spec

- children:

Phrasing content only

TEXT, abbrev, alternatives, array, bold, chem-struct, chem-struct-wrap, code, disp-formula, disp-formula-group, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, media, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

def-item

**<term-head>** spec

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

def-list

**<tex-math>** spec

- children:

TEXT

- parents:

abbrev, abbrev-journal-title, abstract, ack, addr-line, aff, alt-title, alternatives, anonymous, app, app-group, article-title, attrib, award-id, bio, body, bold, boxed-text, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, def-head, degrees, disp-formula, disp-quote, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, glossary, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, notes, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, ref-list, related-article, related-object, role, roman, sans-serif, sc, sec, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-abstract, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <textual-form> [spec](#)

- children:

TEXT, bold, fixed-case, inline-graphic, italic, label, monospace, named-content, overline, overline-end, overline-start, private-char, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, tex-math, underline, underline-end, underline-start

- parents:

alternatives, chem-struct-wrap

## <tfoot> [spec](#)

- children:

tr

- parents:

table

## <th> [spec](#) In Texture we want to model <td> as container I.e., it does not have 'mixed' content

- children:

TEXT, abbrev, alternatives, array, bold, break, chem-struct, chem-struct-wrap, citation-alternatives, code, def-list, disp-formula, disp-formula-group, element-citation, email, ext-link, fixed-case, fn, graphic, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, list, media, milestone-end, milestone-start, mixed-citation, monospace, named-content, nlm-citation, overline, overline-end, overline-start, p, preformat, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

tr

## <thead> [spec](#)

- children:

tr

- parents:

table

## <time-stamp> [spec](#)

- children:

TEXT, day, era, month, season, x, year

- parents:

nlm-citation

## <title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, citation-alternatives, element-citation, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, mixed-citation, monospace, named-content, nlm-citation, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abstract, ack, app, app-group, author-comment, author-notes, back, bio, caption, def-list, disp-quote, fn-group, glossary, kwd-group, list, list-item, notes, ref-list, sec, statement, supplement, table-wrap-foot, trans-abstract, verse-group

## <title-group> [spec](#)

- children:

alt-title, article-title, fn-group, subtitle, trans-title-group

- parents:

article-meta, front-stub

## <tr> [spec](#)

- children:

td, th



- parents:

table, tbody, tfoot, thead

## <trans-abstract> [spec](#)

- children:

ack, address, alternatives, array, boxed-text, chem-struct-wrap, code, def-list, disp-formula, disp-formula-group, disp-quote, fig, fig-group, fn-group, glossary, graphic, label, list, media, notes, object-id, p, preformat, ref-list, related-article, related-object, sec, sec-meta, speech, statement, supplementary-material, table-wrap, table-wrap-group, tex-math, title, verse-group, x

- parents:

article-meta, front-stub

## <trans-source> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object

## <trans-subtitle> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

trans-title-group

## <trans-title> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object,

roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, nlm-citation, product, related-article, related-object, trans-title-group

## <trans-title-group> [spec](#)

- children:

trans-subtitle, trans-title

- parents:

journal-title-group, title-group

## <underline> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <underline-end> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace,

named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <underline-start> [spec](#)

- parents:

abbrev, abbrev-journal-title, addr-line, aff, alt-title, anonymous, article-title, attrib, award-id, bold, chapter-title, chem-struct, code, collab, comment, compound-kwd-part, compound-subject-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, copyright-statement, corresp, data-title, date-in-citation, def-head, degrees, disp-formula, edition, element-citation, email, etal, ext-link, fax, fixed-case, funding-source, funding-statement, given-names, gov, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, price, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, target, td, term, term-head, textual-form, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <unstructured-kwd-group> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

kwd-group

## <uri> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

abbrev, abbrev-journal-title, addr-line, address, aff, alt-title, anonymous, array, article-meta, article-title, attrib, award-id, bold, chapter-title, chem-struct, chem-struct-wrap, code, collab, comment, compound-kwd-part, conf-acronym, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme,

contrib, contrib-group, copyright-statement, corresp, data-title, def-head, degrees, disp-formula, disp-formula-group, edition, element-citation, email, etal, ext-link, fax, fig, fig-group, fixed-case, front-stub, funding-source, funding-statement, given-names, gov, graphic, history, inline-formula, inline-supplementary-material, institution, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, label, license-p, media, meta-name, meta-value, mixed-citation, monospace, named-content, on-behalf-of, overline, p, part-title, patent, phone, prefix, preformat, product, publisher-loc, publisher-name, rb, related-article, related-object, role, roman, sans-serif, sc, self-uri, series, series-text, series-title, sig, sig-block, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, supplementary-material, surname, table-wrap, table-wrap-group, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

## <verse-group> [spec](#)

- children:

attrib, label, permissions, subtitle, title, verse-group, verse-line

- parents:

abstract, ack, app, app-group, bio, body, boxed-text, disp-quote, fig, glossary, license-p, named-content, notes, p, ref-list, sec, styled-content, supplementary-material, table-wrap, trans-abstract, verse-group

## <verse-line> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

verse-group

## <version> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

element-citation, mixed-citation, product, related-article, related-object

## <volume> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, nlm-citation, product, related-article, related-object, volume-issue-group

## <volume-id> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object, volume-issue-group

## <volume-issue-group> [spec](#)

- children:

issue, issue-id, issue-part, issue-sponsor, issue-title, volume, volume-id, volume-series

- parents:

article-meta, front-stub

## <volume-series> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

article-meta, element-citation, front-stub, mixed-citation, product, related-article, related-object, volume-issue-group

## <word-count> [spec](#)

- parents:

counts

## <x> [spec](#)

- children:

TEXT, bold, fixed-case, italic, monospace, named-content, overline, overline-end, overline-start, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, underline, underline-end, underline-start, x

- parents:

abbrev, abbrev-journal-title, abstract, access-date, ack, addr-line, address, aff, alt-title, anonymous, app, app-group, article-meta, article-title, attrib, author-notes, award-id, bio, body, bold, boxed-text, chapter-title, chem-struct, collab, comment, compound-kwd-part, conf-acronym, conf-date, conf-loc, conf-name, conf-num, conf-sponsor, conf-theme, conference, contrib, contrib-group, copyright-holder, copyright-statement, corresp, country, date-in-citation, def-head, def-item, def-list, degrees, disp-formula, disp-quote, edition, element-citation, email, etal, ext-link, fax, fixed-case, fn-group, front-stub, funding-source, funding-statement, given-names, glossary, gov, history, inline-formula, inline-supplementary-material, institution, isbn, issn, issn-l, issue, issue-part, issue-sponsor, issue-title, italic, journal-subtitle, journal-title, kwd, kwd-group, label, license-p, list, long-desc, meta-name, meta-value, mixed-citation, monospace, named-content, notes, on-behalf-of, overline, p, part-title, patent, person-group, phone, prefix, preformat, product, pub-date, publisher-loc, publisher-name, rb, ref, ref-list, related-article, related-object, role, roman, sans-serif, sc, sec, self-uri, series, series-text, series-title, sig, sig-block, size, source, speaker, std-organization, strike, string-conf, string-date, string-name, styled-content, sub, subject, subtitle, suffix, sup, supplement, surname, table-wrap-foot, target, td, term, term-head, th, time-stamp, title, trans-abstract, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, x, xref

## <xref> [spec](#)

- children:

TEXT, abbrev, alternatives, bold, break, chem-struct, email, ext-link, fixed-case, fn, hr, inline-formula, inline-graphic, inline-supplementary-material, italic, milestone-end, milestone-start, monospace, named-content, overline, overline-end, overline-start, private-char, related-article, related-object, roman, ruby, sans-serif, sc, strike, styled-content, sub, sup, target, tex-math, underline, underline-end, underline-start, uri, x, xref

- parents:

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subtitle, suffix, sup, supplement, surname, target, td, term, term-head, th, title, trans-source, trans-subtitle, trans-title, underline, unstructured-kwd-group, uri, verse-line, version, volume, volume-id, volume-series, xref

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- children:

TEXT

- parents:

access-date, conf-date, date, date-in-citation, element-citation, mixed-citation, nlm-citation, product, pub-date, related-article, related-object, std, string-date, time-stamp