CHEMGREEK

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interface for upright greek letters for use in chemistry

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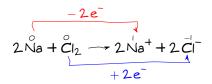


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1. Introduction

The CHEMGREEK package is an auxiliary package for other chemistry packages such as chemmacros. In chemistry there is often the need for upright greek letters. The CHEMGREEK package provides an interface to various other packages that provide upright greek letters. One could mention textgreek, upgreek, newtx or kpfonts. All of these packages provide upright greek letters, some a whole alphabet some only the upright variants of the standard italic symbols for which macros are defined in base LATEX.

CHEMGREEK offers a possibility to map those different interfaces to a unified set of macros for usage in a chemistry package. This is useful as then for example names like β -D-glucopyranose can be typeset with a semantic interface and still have matching greek letters while the user is not limited to a certain package or font. Consequently this package is used by the chemnacros package [Nie15a] and its IUPAC naming commands, for example, and by the chemnum package [Nie15b].

2. Licence and Requirements

Permission is granted to copy, distribute and/or modify this software under the terms of the LATEX Project Public License (LPPL), version 1.3 or later (http://www.latex-project.org/lppl.txt). The software has the status "maintained."

CHEMGREEK loads the following packages: expl3 1 [L3Pa], xparse 2 [L3Pb] and amstext 3 [MSoo].

3. News

3.1. Version 0.2

- The mapping "mathdesign" has been added. In order to use it you need the mathdesign package [Pic13] loaded and use one of its options.
- The mapping "fourier" has been added. In order to use it you need the fourier package [Bovo5] loaded.

3.2. Version 0.3

• The provided macros have been renamed from \Chem(...) into \chem(...). The uppercase version still are provided for backwards compatibility but issue a warning message and

^{1.} on CTAN as l3kernel: http://mirrors.ctan.org/macros/latex/contrib/l3kernel/

^{2.} on CTAN as l3packages: http://mirrors.ctan.org/macros/latex/contrib/l3packages/

^{3.} http://ctan.org/tex-archive/macros/latex/required/amslatex/math

will be removed some time in the future.

- The commands for defining mappings have gotten an optional argument which allows to specify the name of the package a mapping needs. The command \selectchemgreekmapping now checks for this package and gives a warning if it doesn't find it loaded.
- The mapping "textalpha" has been added. In order to use it you need the textalpha package (part of greek-fontenc [Mil13]) loaded.
- If the package hyperref [OR12] is loaded with the unicode option and the textalpha package has been loaded at begin document all the \chem(...) commands are let to textalpha's \text{...} commands for the PDF bookmarks. This allows Greek letters in the bookmarks without worrying about \text{texorpdfstring}.

3.3. Version 0.4

- The mapping "fontspec" has been added. In order to use it you need the fontspec package [RH13] loaded. This means it can only be used with Lual-TeX or X-1-TeX.
- New command \printchemgreekalphabet.

3.4. Version 0.5

• The package is now distributed independently from the chemmacros package.

3.5. Version 0.5

• The deprecated macros $\mbox{Chem}(...)$ have been dropped and will now cause an error if used.

3.6. Version 1.0

- If a mapping is activated that needs a package and the package is missing CHEMGREEK falls back to the 'default' mapping now.
- If exactly one package for one of the mappings has been loaded the corresponding mapping is activated at begin document, see also section 5.
- expl3 versions of the letter macros (\chemgreek_alpha:, \chemgreek_Alpha:, ...)
- New macros \chemgreekmappingsymbol (see section 8), \newchemgreekmappingalias, \renewchemgreekmappingalias and \declarechemgreekmappingalias (see section 4).

4. Define Mappings

CHEMGREEK's main commands are:

4. Define Mappings

 $\mbox{newchemgreekmapping}[\langle package \rangle] {\langle name \rangle} {\langle mapping list \rangle}$

Changed in version 0.3

Add a new mapping to CHEMGREEK. Issues an error if a mapping with the same name already exists. With the optional argument the package that is needed for this mapping can (and should) be specified.

Changed in version 0.3

Renew a **CHEMGREEK** mapping. Issues an error if the mapping doesn't exist yet. With the optional argument the package that is needed for this mapping can (and should) be specified.

 $\declarechemgreekmapping[\langle package \rangle] \{\langle name \rangle\} \{\langle mapping \ list \rangle\}$

Changed in version 0.3

Declare a new mapping to CHEMGREEK. If the mapping already exists it will be overwritten. With the optional argument the package that is needed for this mapping can (and should) be specified.

 $\mbox{newchemgreekmappingalias} {\mbox{new mapping name}} {\mbox{dexisting mapping name}}$

Introduced in version 1.0

Define an alias mapping. Issues an error if *(new mapping name)* already exists.

Introduced in version 1.0

\renewchemgreekmappingalias{\(\lambda\) name\\}{\(\lambda\) sting mapping name\\}\\
Redefine a mapping to an alias of an existing mapping. Issues an error if \(\lambda\) new mapping name\\
doesn't exist, yet.

\declarechemgreekmappingalias { $\langle new \ mapping \ name \rangle$ } { $\langle existing \ mapping \ name \rangle$ } Define an alias mapping. Doesn't check, if { $\langle new \ mapping \ name \rangle$ } exists or not.

Introduced in version 1.0

The command \newchemgreekmapping needs to get a comma separated list of 24 pairs divided by a slash. The first entry is the lowercase version und the second the uppercase version for the corresponding greek letter at the current position. This will become clearer if you look at how the default mapping is defined:

```
1 \newchemgreekmapping{default}
2
      \ensuremath{\alpha}
                           / \ensuremath{\mathrm{A}} , % 1: alpha
3
      \ensuremath{\beta}
                           / \ensuremath{\mathbf{B}}\ , % 2: beta
                          / \ensuremath{\Gamma} , % 3: gamma
      \ensuremath{\gamma}
                                                     % 4: delta
      \ensuremath{\delta} / \ensuremath{\Delta} ,
      \ensuremath{\epsilon} / \ensuremath{\mathrm{E}} , % 5: epsilon
                           / \ensuremath{\mathrm{Z}} , % 6: zeta
      \ensuremath{\zeta}
                           / \ensuremath{\mathrm{H}}} , % 7: eta
      \ensuremath{\eta}
      \ensuremath{\theta}
                           / \ensuremath{\Theta} ,
                                                     % 8: theta
10
      \ensuremath{\iota}
                           / \ensuremath{\mathrm{I}} , % 9: iota
11
                           / \ensuremath{\mathrm{K}} , % 10: kappa
      \ensuremath{\kappa}
      \ensuremath{\lambda} / \ensuremath{\Lambda} , % 11: lambda
13
      \ensuremath{\mu}
                           / \ensuremath{\mathrm{M}} , % 12: mu
14
      \ensuremath{\nu}
                           / \ensuremath{\mathrm{N}} , % 13: nu
15
                                                  % 14: xi
                           / \ensuremath{\Xi} ,
      \ensuremath{\xi}
16
                           / \ensuremath{\mathrm\{0\}} , % 15: omikron
      \ensuremath{o}
17
```

```
% 16: pi
      \ensuremath{\pi}
                           / \ensuremath{\Pi} ,
      \ensuremath{\rho}
                           / \ensuremath{\mathrm{P}} , % 17: rho
19
      \ensuremath{\sigma} / \ensuremath{\Sigma} ,
                                                       % 18: sigma
20
      \ensuremath{\tau}
                           / \ensuremath{\mathrm{T}} , % 19: tau
      \ensuremath{\upsilon} / \ensuremath{\Upsilon} , % 20: upsilon
      \ensuremath{\phi}
                           / \ensuremath{\Phi} ,
                                                       % 21: phi
23
                           / \ensuremath{\Psi} ,
      \ensuremath{\psi}
                                                       % 22: psi
                           / \ensuremath{\mathrm{X}} , % 23: chi
      \ensuremath{\chi}
                           / \ensuremath{\Omega}
                                                       % 24: omega
      \ensuremath{\omega}
27 }
```

There *must* be 24 pairs of entries, *i. e.*, a complete mapping! Those entries are the ones that will be used by the interface macros. For each letter a pair \chemalpha/\chemAlpha is defined that uses the entries of the currently active mapping. That means there are 48 (robust) macros defined each beginning with \chem... followed by the lowercase or uppercase name of the Greek letter.

The default mapping is – as you can probably see – *not an upright one*. This is because **CHEMGREEK** will not make any choice for a specific package but let's the user (or another package) choose. **CHEMGREEK** however recognizes if *an unambiguous choice* for one of the upright mappings is possible and if it is will select the appropriate mapping at begin document.

* \l_chemgreek_active_mapping_tl

The currently active mapping is always available in the token list variable.

5. Predefined Mappings and Selection of a Mapping

CHEMGREEK predefines some mappings. Some of the mappings require additional packages to be loaded. The mapping names and the required packages are listed in table 1. The mapping fontspec is a bit different here: if you use this mapping then the fact is used that fontspec also defines commands like \textalpha. However, they only work if you also use a font that has the Greek glyphs.

If exactly *one* of the packages required by one of the mappings has been loaded such that an unambiguous choice is possible then **CHEMGREEK** will choose and activate the corresponding mapping at begin document. If an umbiguous choice isn't possible then **CHEMGREEK** will select the 'default' mapping at begin document. If a user has selected a mapping manually in

5. Predefined Mappings and Selection of a Mapping

mapping	package
default	_
var-default	_
textgreek	textgreek [Mic11]
upgreek	upgreek [Scho3]
newtx	newtxmath [Sha13]
kpfonts	kpfonts [Cai10]
pxgreeks	pxgreeks [Bur11]
mathdesign	mathdesign [Pic13]
fourier	fourier [Bovo5]
textalpha	textalpha [Mil13]
fontspec	fontspec [RH13]

TABLE 1: Predefined mappings.

the preamble (with one of the commands explained in a bit) then CHEMGREEK will do nothing on its own.

A mapping is selected and activated manually with one of the following commands:

$\activatechemgreekmapping*{\langle name \rangle}$

Changed in version 1.0

This commands selects and activates the mapping $\langle name \rangle$. If the star variant is used also the package of mapping $\langle name \rangle$ (as defined with \newchemgreekmapping is loaded. Otherwise a required package has to be loaded additionally the usual way via \usepackage or \RequirePackage. If the package hasn't been loaded a warning will be written to the log and the 'default' mapping will be activated instead. The command can only be used in the document preamble.

$\sl = \sl = \sl$

Changed in version 1.0

This commands selects and activates the mapping $\langle name \rangle$. A required package has to be loaded additionally the usual way via \usepackage or \RequirePackage. If the package hasn't been loaded a warning will be written to the log and the 'default' mapping will be activated instead. The command can be used throughout the document.

Since the fontspec mapping is a little bit different than the others I'd like to show a little example for it. The difference is subtle: you need to choose a font containing the needed glyphs.

```
1 \documentclass[margin=3pt]{standalone}
2 \usepackage{fontspec}
3 \setmainfont{Linux Libertine 0}% need a font that has the glyphs!
4 \usepackage{chemgreek}
5 \selectchemgreekmapping{fontspec}
6 \begin{document}
7 \printchemgreekalphabet
8 \end{document}

αA βΒ γΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρΡ σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ
```

6. Changing a Specific Symbol in an Existing Mapping

If you should want to change a specific entry of a specific mapping it would be rather tedious to redefine the whole mapping. That is why **CHEMGREEK** provides a command for that purpose:

```
\changechemgreeksymbol{\langle mapping \ name \rangle}{upper|lower}{\langle entry \ name \rangle}{\langle entry \rangle}
Changes the upper- or lowercase entry \langle entry \ name \rangle in the mapping \langle mapping \ name \rangle.
```

In order to activate the change you need the (re-) activate the affected mapping afterwards:

```
1 \chemalpha
2 \changechemgreeksymbol{default}{lower}{alpha}{xxx}%
3 \selectchemgreekmapping{default}
4 \chemalpha

α xxx
```

7. Inspecting a Mapping

If you want to check if a mapping has been correctly set you can use the following commands:

```
\printchemgreekmapping{\langle mapping \rangle}
```

Introduced in version 0.3

This will typeset a table (using a simple tabular environment) with all 48 characters like the one shown in table 2.

8. Additional Macros

name	lower	upper
alpha	α	A
beta	β	В
gamma	γ	Γ
delta	δ	Δ
epsilon	ϵ	E
zeta	ζ	Z
eta	η	Н
theta	θ	Θ
iota	ι	I
kappa	κ	K
lambda	λ	Λ
mu	μ	M
nu	ν	N
xi	ξ	Ξ
omikron	0	O
pi	π	Π
rho	ρ	R
sigma	σ	Σ
tau	τ	T
upsilon	υ	Υ
phi	ф	Φ
psi	ψ	Ψ
chi	χ	X
omega	ω	Ω
	alpha beta gamma delta epsilon zeta eta theta iota kappa lambda mu nu xi omikron pi rho sigma tau upsilon phi psi chi	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

Table 2: A demonstration of the \printchemgreekmapping command.

\printchemgreekalphabet

Introduced in version 0.4

This will print the twentyfour pairs of lower- and uppercase letters of the currently active mapping: $\alpha A \beta B \gamma \Gamma \delta \Delta \epsilon E \zeta Z \eta H \theta \Theta \iota I \kappa K \lambda \Lambda \mu M \nu N \xi \Xi o O \pi \Pi \rho R \sigma \Sigma \tau T \upsilon \Gamma \varphi \Phi \psi \Psi \chi X \omega \Omega$.

Changed in version 0.3

This command will write information about the definition of all 48 macros for a mapping to the log file.

8. Additional Macros

$\chemgreekmappingsymbol{\langle mapping name \rangle} {\langle symbol name \rangle}$

A command which prints a specific symbol of a specific mapping. The mapping $\langle mapping \ name \rangle$ doesn't need to be active but package dependencies must be taken care of, *i.e.*, if $\langle mapping \ name \rangle$ needs a certain package to be loaded you should make sure that it is.

A. Overviews Over the Mappings

A.1. Mapping 'default'

 α A βB γΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρΡ σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ

A.2. Mapping 'var-default'

 $\alpha A \ \beta B \ \gamma \Gamma \ \delta \Delta \ \varepsilon E \ \zeta Z \ \eta H \ \theta \Theta \ \iota I \ \kappa K \ \lambda \Lambda \ \mu M \ \nu N \ \xi \Xi \ o O \ \pi \Pi \ \varrho P \ \sigma \Sigma \ \tau T \ v \Upsilon \ \phi \Phi \ \psi \Psi \ \chi X \ \omega \Omega$

A.3. Mapping 'textgreek'

αΑ βΒ γΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρΡ σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ

A.4. Mapping 'upgreek'

αΑ βΒ γΓ δΔ ϵ Ε ζΖ ηΗ θΘ ι Ι κΚ λΛ μ Μ νΝ ξΞ ι Ο τ Π ρ R σΣ τ Τ ι ν ϕ Φ ψ Ψ χ Χ ω Ω

A.5. Mapping 'newtx'

αΑ βΒ γΓ δΔ ϵ Ε ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρR σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ

A.6. Mapping 'kpfonts'

αΑ βΒ γΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρR σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ

A.7. Mapping 'pxgreeks'

 α A βB γ Γ δΔ ϵ E ζZ η H θΘ ι I κΚ λΛ μ M ν N ξΞ ϵ O π Π ϵ R ϵ Σ ϵ T ϵ Υ ϵ Φ ϵ Ψ ϵ Χ ϵ Ω

A.8. Mapping 'mathdesign' with package option utopia

 $\alpha A\,\beta B\,\gamma \Gamma\,\delta\Delta\,\varepsilon E\,\zeta Z\,\eta H\,\theta\Theta\,\iota I\,\,\kappa K\,\lambda\Lambda\,\mu M\,\,\nu N\,\,\xi\Xi\,\sigma O\,\,\pi\Pi\,\rho R\,\sigma\Sigma\,\tau T\,\,\upsilon\Upsilon\,\varphi\Phi\,\psi\Psi\,\chi X\,\omega\Omega$

A.g. Mapping 'mathdesign' with package option charter

 $\alpha A~\beta B~\gamma \Gamma~\delta \Delta~\varepsilon E~\zeta Z~\eta H~\theta \Theta~\iota I~\kappa K~\lambda \Lambda~\mu M~\nu N~\xi \Xi~o O~\pi \Pi~\rho R~\sigma \Sigma~\tau T~\upsilon \Upsilon~\varphi \Phi~\psi \Psi~\chi X~\omega \Omega$

A.10. Mapping 'fourier'

 $\alpha A~\beta B~\gamma \Gamma~\delta \Delta~\varepsilon E~\zeta Z~\eta H~\theta \Theta~\iota I~\kappa K~\lambda \Lambda~\mu M~\nu N~\xi \Xi~o O~\pi \Pi~\rho R~\sigma \Sigma~\tau T~\upsilon \Upsilon~\varphi \Phi~\psi \Psi~\chi X~\omega \Omega$

A.11. Mapping 'textalpha'

αΑ βΒ γΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρΡ σΣ τΤ υΥ φΦ ψΨ χΧ ω Ω

A.12. Mapping 'fontspec' with Font 'Linux Libertine'

αΑ βΒ ΥΓ δΔ εΕ ζΖ ηΗ θΘ ιΙ κΚ λΛ μΜ νΝ ξΞ οΟ πΠ ρΡ σΣ τΤ υΥ φΦ ψΨ χΧ ωΩ

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