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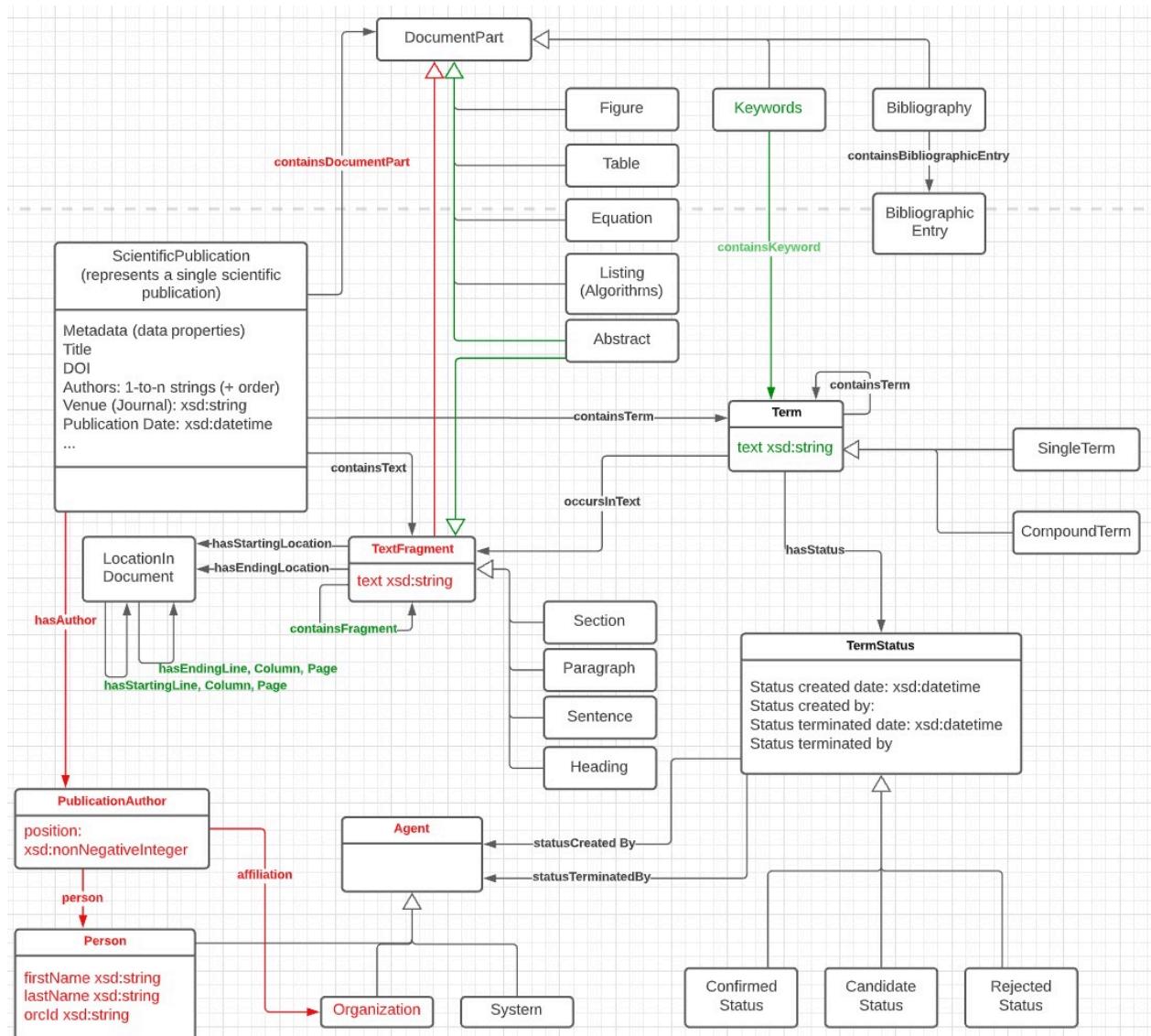
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## Part A: SciPub diagram



## Part A: Queries about specific terms

### 1. Pull all fragments which include the term “ cellulose”.

```
select ?t?p where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f .
  ?f sp:text ?p .
  FILTER(CONTAINS(lcase(?p),"cellulose") ).
}
```

Or

```
select ?t?p where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f .
  ?f sp:text ?p .
  FILTER(CONTAINS(?p,"cellulose") ).
}
```

### 2. List all contains “ strength”

```
select ?p?c where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?p .
  ?p sp:text ?c .
  FILTER(CONTAINS(lcase(?c),"strength")).
```

### 3. Give me all the sentences about lignin

```
select ?f?i where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f.
  ?t sp:secNumber ?n .
  ?f sp:text ?i .
  filter(contains(?i, "lignin")) .
```

t	p
1 http://cellograph.com/SciPub/2022v1.0/pubASec1	"Nanocellulose is a natural nanomaterial which can be extracted from plant cell wall."
2 http://cellograph.com/SciPub/2022v1.0/pubASec1	"With its nanometer size in diameter, nanocellulose consists of attractive properties such as high strength, excellent stiffness, and high surface area [12]"
3 http://cellograph.com/SciPub/2022v1.0/pubASec1	"Nowadays, nanocellulose gets high attraction from research and industries."
4 http://cellograph.com/SciPub/2022v1.0/pubASec1	"The study of nanocellulose is not only about its extraction from biomass, but also the new applications in various fields."
5 http://cellograph.com/SciPub/2022v1.0/pubASec3	"3. Nanocellulose"
6 http://cellograph.com/SciPub/2022v1.0/pubASec4	"4. Application of nanocellulose"
7 http://cellograph.com/SciPub/2022v1.0/pubASec5	"5. Extraction of nanocellulose from lignocellulose biomass"
8 http://cellograph.com/SciPub/2022v1.0/pubASec5	"5.2. Extraction of nanocellulose"
9 http://cellograph.com/SciPub/2022v1.0/pubASec5_2	"5.2. Extraction of nanocellulose"
10 http://cellograph.com/SciPub/2022v1.0/pubASec6	"6. Extraction of nanocellulose with the assistance of ball milling"

p	c
1 http://cellograph.com/SciPub/2022v1.0/Para4Sent3	"with its nanometer size in diameter, nanocellulose consists of attractive properties such as high strength, excellent stiffness, and high surface area [12]"

f	i
1 http://cellograph.com/SciPub/2022v1.0/Para4Sent1	"Cell wall structure of lignocellulosic biomass mainly consists of three kinds of polymer, i.e., lignin, hemicellulose, and cellulose."
2 http://cellograph.com/SciPub/2022v1.0/Para4Sent4	"In plant cell walls, lignin serves as the binder which holds between and around cellulose and hemicellulose complexon (Fig. 1)"
3 http://cellograph.com/SciPub/2022v1.0/Para22Sent3	"Firstly, the non-cellulosic components, such as lignin, hemicellulose, and other compounds, are removed by the pretreatment."
4 http://cellograph.com/SciPub/2022v1.0/Para22Sent3	"Firstly, the non-cellulosic components, such as lignin, hemicellulose, and other compounds, are removed by the pretreatment."

#### 4. Which section is about extraction methods?

```
select distinct ?t where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f.
  ?f sp:text ?i .
  filter (contains(?i, "extraction method")) .
}
```

```
r 9 select distinct ?t where {
10   :pubA sp:containsText ?t .
11   ?t sp:containsFragment ?f.
12   ?f sp:text ?i .
13   filter (contains(?i, "extraction method")) .
14 }
```

Press Table Raw Response Pivot Table Google Chart

Filter query results Showing results from 1 to 2 of 2.

t
1 http://cellograph.com/SciPub/2022v1.0/pubASec5
2 http://cellograph.com/SciPub/2022v1.0/pubASec5_1

#### 5. Give me all the confirmed single term

```
select ?i where {?s rdf:type :SingleTerm .
  ?s :hasStatus ?o .
  ?o rdf:type :ConfirmedStatus.
  ?s sp:text ?i .
}
```

```
r 9 select ?i where (?s rdf:type :SingleTerm .
10   ?s :hasStatus ?o .
11   ?o rdf:type :ConfirmedStatus.
12   ?s sp:text ?i .
13 }
```

Press Table Raw Response Pivot Table Google Chart

Filter query results Showing results from 1 to 6 of 6.

i
1 "nanocellulose"
2 "properties"
3 "modification"
4 "nanomaterial"
5 "plant"
6 "size"

#### 6. Where the rejected you compound occurred?

```
select ?t ?i where {?s rdf:type :CompoundTerm .
  ?s :hasStatus ?o .
  ?o rdf:type :RejectedStatus.
  ?s :text ?t .
  ?s :occurredInText ?i .
```

```
1 prefix sp: <http://cellograph.com/SciPub/2022v1.0/>
2 prefix : <http://cellograph.com/SciPub/2022v1.0/>
3 prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
5 prefix xsd: <http://www.w3.org/2001/XMLSchema#>
6 prefix owl: <http://www.w3.org/2002/07/owl#>
7 prefix dcterms: <https://purl.org/dc/terms/>
8
9 select ?t ?i where {?s rdf:type :CompoundTerm .
10   ?s :hasStatus ?o .
11   ?o rdf:type :RejectedStatus.
12   ?s :text ?t .
13   ?s :occurredInText ?i .
14 }
```

Run Unnamed X Unnamed X Unnamed X +

Table Raw Response Pivot Table Google Chart Download as

Filter query results Showing results from 1 to 3 of 3. Query took 0.1s, minutes ago.

t	s	i	c
1 "due to"			http://cellograph.com/SciPub/2022v1.0/AbsSent1
2 "such as"			http://cellograph.com/SciPub/2022v1.0/AbsSent1
3 "such as"			http://cellograph.com/SciPub/2022v1.0/ParaSent3

## Part B: Queries about location

### 7. List the starting location of every documentPart :

```
select * where {:pubA sp:containsDocumentPart ?t .
?t :hasStartingLocation ?p .
?p :hasStartingPage ?q .
?p :hasStartingLine ?l .}
```

The screenshot shows the Cellograph interface with a query editor and a results table. The query is:

```

1 prefix sp: <http://cellograph.com/SciPub/2022v1.0/>
2 prefix : <http://cellograph.com/SciPub/2022v1.0/>
3 prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
4 prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
5 prefix xsd: <http://www.w3.org/2001/XMLSchema#>
6 prefix owl: <http://www.w3.org/2002/07/owl#>
7 prefix dcterms: <http://purl.org/dc/terms/>
8
9
10 select ?t?q?l where {:pubA sp:containsDocumentPart ?t .
11 ?t :hasStartingLocation ?p .
12 ?p :hasStartingPage ?q .
13 ?p :hasStartingLine ?l .
14 }
15

```

The results table shows two rows of data:

	t	q	l
1	<a href="http://cellograph.com/SciPub/2022v1.0/Abstract1">http://cellograph.com/SciPub/2022v1.0/Abstract1</a>	*1*xsd:nonNegativeInteger	*1*xsd:nonNegativeInteger
2	<a href="http://cellograph.com/SciPub/2022v1.0/Acknowledgements1">http://cellograph.com/SciPub/2022v1.0/Acknowledgements1</a>	*10*xsd:nonNegativeInteger	*28*xsd:nonNegativeInteger

### 8. List the starting location of every sections :

```
select ?t?q?l where {:pubA sp:containsText ?t .
?t :hasStartingLocation ?p .
?p :hasStartingPage ?q .
?p :hasStartingLine ?l .}
```

The screenshot shows the Cellograph interface with a query editor and a results table. The query is:

```

8
9
10 select ?t?q?l where {:pubA sp:containsText ?t .
11 ?t :hasStartingLocation ?p .
12 ?p :hasStartingPage ?q .
13 ?p :hasStartingLine ?l .
14 }

```

The results table shows seven rows of data:

	t	q	l
1	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec1">http://cellograph.com/SciPub/2022v1.0/pubASec1</a>	*1*xsd:nonNegativeInteger	*3*xsd:nonNegativeInteger
2	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec2">http://cellograph.com/SciPub/2022v1.0/pubASec2</a>	*2*xsd:nonNegativeInteger	*11*xsd:nonNegativeInteger
3	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec3">http://cellograph.com/SciPub/2022v1.0/pubASec3</a>	*2*xsd:nonNegativeInteger	*36*xsd:nonNegativeInteger
4	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec4">http://cellograph.com/SciPub/2022v1.0/pubASec4</a>	*4*xsd:nonNegativeInteger	*37*xsd:nonNegativeInteger
5	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec5">http://cellograph.com/SciPub/2022v1.0/pubASec5</a>	*5*xsd:nonNegativeInteger	*45*xsd:nonNegativeInteger
6	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec6">http://cellograph.com/SciPub/2022v1.0/pubASec6</a>	*6*xsd:nonNegativeInteger	*51*xsd:nonNegativeInteger
7	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec7">http://cellograph.com/SciPub/2022v1.0/pubASec7</a>	*10*xsd:nonNegativeInteger	*1*xsd:nonNegativeInteger

### 9. List the ending location of every sections :

```
select ?t?q?l where {:pubA sp:containsText ?t .
?t :hasEndingLocation ?p .
?p :hasEndingPage ?q .
?p :hasEndingLine ?l .}
```

The screenshot shows the Cellograph interface with a query editor and a results table. The query is:

```

6
7
8
9
10 select ?t?q?l where {:pubA sp:containsText ?t .
11 ?t :hasEndingLocation ?p .
12 ?p :hasEndingPage ?q .
13 ?p :hasEndingLine ?l .
14 }

```

The results table shows seven rows of data:

	t	q	l
1	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec1">http://cellograph.com/SciPub/2022v1.0/pubASec1</a>	*2*xsd:nonNegativeInteger	*9*xsd:nonNegativeInteger
2	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec2">http://cellograph.com/SciPub/2022v1.0/pubASec2</a>	*2*xsd:nonNegativeInteger	*34*xsd:nonNegativeInteger
3	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec3">http://cellograph.com/SciPub/2022v1.0/pubASec3</a>	*4*xsd:nonNegativeInteger	*35*xsd:nonNegativeInteger
4	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec4">http://cellograph.com/SciPub/2022v1.0/pubASec4</a>	*5*xsd:nonNegativeInteger	*36*xsd:nonNegativeInteger
5	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec5">http://cellograph.com/SciPub/2022v1.0/pubASec5</a>	*6*xsd:nonNegativeInteger	*49*xsd:nonNegativeInteger
6	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec6">http://cellograph.com/SciPub/2022v1.0/pubASec6</a>	*9*xsd:nonNegativeInteger	*34*xsd:nonNegativeInteger
7	<a href="http://cellograph.com/SciPub/2022v1.0/pubASec7">http://cellograph.com/SciPub/2022v1.0/pubASec7</a>	*10*xsd:nonNegativeInteger	*26*xsd:nonNegativeInteger

## 10. Which page all fragments start?

```
select ?p?c where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?p .
  ?p sp:hasStartingLocation ?s .
  ?s sp:hasStartingPage ?c .
}
```

The screenshot shows the Cellograph interface with the query results for question 10. The results are displayed in a table with columns labeled 'p' and 'c'. The table contains 14 rows, each with a URL from http://cellograph.com/SciPub/2022v1.0/ and an integer value for 'c'.

	p	c
1	http://cellograph.com/SciPub/2022v1.0/pubASec1Header	*1* "xsd:nonNegativeInteger
2	http://cellograph.com/SciPub/2022v1.0/pubASec2Header	*2* "xsd:nonNegativeInteger
3	http://cellograph.com/SciPub/2022v1.0/pubASec3Header	*2* "xsd:nonNegativeInteger
4	http://cellograph.com/SciPub/2022v1.0/pubASec4Header	*4* "xsd:nonNegativeInteger
5	http://cellograph.com/SciPub/2022v1.0/pubASec5Header	*5* "xsd:nonNegativeInteger
6	http://cellograph.com/SciPub/2022v1.0/pubASec6Header	*6* "xsd:nonNegativeInteger
7	http://cellograph.com/SciPub/2022v1.0/pubASec7Header	*10* "xsd:nonNegativeInteger
8	http://cellograph.com/SciPub/2022v1.0/Paragraph1	*1* "xsd:nonNegativeInteger
9	http://cellograph.com/SciPub/2022v1.0/Para1Sent1	*1* "xsd:nonNegativeInteger

## 11. List the starting lines of all sectors, paragraphs, and sentences :

```
select ?s?c where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?p .
  ?p sp:hasStartingLocation ?s .
  ?s sp:hasStartingLine ?c .
}
order by ?c
```

The screenshot shows the Cellograph interface with the results for question 11. The results are displayed in a table with columns labeled 's' and 'c'. The table contains 10 rows, each with a URL from http://cellograph.com/SciPub/2022v1.0/ and an integer value for 'c'.

	s	c
1	http://cellograph.com/SciPub/2022v1.0/ParaStartLoc	Http://cellograph.com/SciPub/2022v1.0/page1
2	http://cellograph.com/SciPub/2022v1.0/ParaStartLoc	*4* "xsd:nonNegativeInteger
3	http://cellograph.com/SciPub/2022v1.0/paraSec1StartLoc	*4* "xsd:nonNegativeInteger
4	http://cellograph.com/SciPub/2022v1.0/paraStartLoc	*3* "xsd:nonNegativeInteger
5	http://cellograph.com/SciPub/2022v1.0/pubASec1StartLoc	*4* "xsd:nonNegativeInteger
6	http://cellograph.com/SciPub/2022v1.0/pubASec2StartLoc	*4* "xsd:nonNegativeInteger
7	http://cellograph.com/SciPub/2022v1.0/pubASec3StartLoc	*5* "xsd:nonNegativeInteger
8	http://cellograph.com/SciPub/2022v1.0/pubASec4StartLoc	*3* "xsd:nonNegativeInteger
9	http://cellograph.com/SciPub/2022v1.0/pubASec5StartLoc	*4* "xsd:nonNegativeInteger
10	http://cellograph.com/SciPub/2022v1.0/pubASec6StartLoc	*5* "xsd:nonNegativeInteger

## Part C: Queries about documentPart and textFragment

### 12. List all the fragment parts contained in pubA :

```
select * where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?p .
  ?p sp:text ?c . }
```

### 13. List all sectors, paragraphs, and sentences

```
select * where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?p .
  ?p sp:containsFragment ?s .
  ?s sp:text ?c . }
```

}  
order by ?t

### 14. Pull all fragments starting in page N and page M

```
select ?f?p where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f .
  ?f sp:hasStartingLocation ?s .
  ?s sp:hasStartingPage ?p .
  FILTER (?p >= "1"^^xsd:nonNegativeInteger && ?p <=
  "2"^^xsd:nonNegativeInteger)
}
```

}  
order by ?p

## 16. List caption and page of figure N

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Figure .
  ?t sp:text ?k .
  ?t sp:hasStartingPage ?page .
  ?t sp:figureNumber ?number .
  Filter(?number = "1"^^xsd:nonNegativeInteger) .
}
```

The screenshot shows a SPARQL query interface with the following details:

- Paste Area:**

```
prefix rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
prefix rdf: <http://www.w3.org/2000/01/rdf-schema#>
prefix xsd: <http://www.w3.org/2001/XMLSchema#>
prefix owl: <http://www.w3.org/2002/07/owl#>
prefix dcterms: <http://purl.org/dc/terms/>

select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Figure .
  ?t sp:text ?k .
  ?t sp:hasStartingPage ?page .
  ?t sp:figureNumber ?number .
  Filter(?number = "1"^^xsd:nonNegativeInteger) .
}
```
- Run Button:** A red "Run" button is visible in the top right.
- Table View:** The results are presented in a table with columns: t, k, page, and number.
- Data:**

	t	k	page	number
1	<a href="http://celigraph.com/SciPub">http://celigraph.com/SciPub</a>	"Main structure of plant cellul wall in lignocellulosic biomass which is consisted of lignin, hemicellulose, and cellulose."	"2"^^xsd:nonNegativeInteger	"1"^^xsd:nonNegativeInteger

## 17. Give me the caption and page of table N

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Table .
  ?t sp:text ?k .
  ?t sp:hasStartingPage ?page .
  ?t sp:tableNumber ?number .
  Filter(?number = "1"^^xsd:nonNegativeInteger) .
}
```

The screenshot shows a SPARQL query interface with the following details:

- Paste Area:**

```
prefix rdfs: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
prefix rdf: <http://www.w3.org/2000/01/rdf-schema#>
prefix xsd: <http://www.w3.org/2001/XMLSchema#>
prefix owl: <http://www.w3.org/2002/07/owl#>
prefix dcterms: <http://purl.org/dc/terms/>

select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Table .
  ?t sp:text ?k .
  ?t sp:hasStartingPage ?page .
  ?t sp:tableNumber ?number .
  Filter(?number = "1"^^xsd:nonNegativeInteger) .
}
```
- Run Button:** A red "Run" button is visible in the top right.
- Table View:** The results are presented in a table with columns: t, k, page, and number.
- Data:**

	t	k	page	number
1	<a href="http://celigraph.com/SciPub">http://celigraph.com/SciPub</a>	"Progress of nanocellulose extraction by ball milling."	"8"^^xsd:nonNegativeInteger	"1"^^xsd:nonNegativeInteger

## 18. Give me all the keywords

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Keywords .
  ?t sp:text ?k .
}
```

The screenshot shows a SPARQL query interface with the following details:

- Paste Area:**

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type :Keywords .
  ?t sp:text ?k .
}
```
- Table View:** The results are presented in a table with columns: t and k.
- Data:**

	t	k
1	<a href="http://celigraph.com/SciPub/2022v1.0/Keyword1">http://celigraph.com/SciPub/2022v1.0/Keyword1</a>	"Biomass"
2	<a href="http://celigraph.com/SciPub/2022v1.0/Keyword2">http://celigraph.com/SciPub/2022v1.0/Keyword2</a>	"Cellulose"
3	<a href="http://celigraph.com/SciPub/2022v1.0/Keyword3">http://celigraph.com/SciPub/2022v1.0/Keyword3</a>	"Nanocellulose fiber"
4	<a href="http://celigraph.com/SciPub/2022v1.0/Keyword4">http://celigraph.com/SciPub/2022v1.0/Keyword4</a>	"Extraction"
5	<a href="http://celigraph.com/SciPub/2022v1.0/Keyword5">http://celigraph.com/SciPub/2022v1.0/Keyword5</a>	"Application"

## 19. Show me the reference N

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type sp:BibliographicEntry .
  ?t sp:text ?k .
  Filter(contains(?k, '[3]')).
```

The screenshot shows a SPARQL query interface with the following details:

- Paste Area:**

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type sp:BibliographicEntry .
  ?t sp:text ?k .
  Filter(contains(?k, '[3]')).
```
- Run Button:** A red "Run" button is visible in the top right.
- Table View:** The results are presented in a table with columns: t and k.
- Data:**

	t	k
1	<a href="http://celigraph.com/SciPub/2022v1.0/BibliographicEntry">http://celigraph.com/SciPub/2022v1.0/BibliographicEntry</a>	"[3] H.V. Lee, S.B.A. Hamid, S.K. Zain, Conversion of lignocellulosic biomass to nanocellulose: structure and chemical properties, Sci. World J. 2014 (2014) 1–20."

Or

```
select ?ref where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type sp:BibliographicEntry.
  ?t sp:position ?N .
  ?t sp:text ?ref .
  Filter(?N='5'^^xsd:nonNegativeInteger).
}
```

ref
"[5] V.B. Agbor, N. Cicek, R. Sparling, A. Berlin, D.B. Levin, Biomass pretreatment: fundamentals toward application, Biotechnol. Adv. 29 (2011) 675–685."

## 20. Give me all info about figure N

```
select * where {
  :pubA sp:containsDocumentPart ?t .
  ?t rdf:type sp:Figure .
  ?t sp:text ?caption.
  ?t sp:page ?page .
  ?t sp:figureNumber ?n
  filter(?n='9'^^xsd:nonNegativeInteger)
}
```

t	n
http://celigraph.com/SciP... "SEM images of cotton-derived cellulose after ball milling in (a) dry state, (b) water, (c) toluene, and (d) 1-butanol [100]. [Reprinted by permission from Springer Nature, Copyright (2007).]"	"9"^^xsd:nonNegativeInteger

## 21. Show me sector N

```
select ?f?i where {
  :pubA sp:containsText ?t .
  ?t sp:containsFragment ?f.
  ?t sp:secNumber ?n .
  ?f sp:text ?i
  filter(?n='1'^^xsd:nonNegativeInteger).
}
```

f	i
http://celigraph.com/SciPub/2022v1.0/pub3SectionHeader	"Introduction"
http://celigraph.com/SciPub/2022v1.0/Par1Sent1	"In the 21st century, when humans become aware of environmental conservable resources become more and more important for their daily life since the"
http://celigraph.com/SciPub/2022v1.0/Par1Sent2	"Nanocellulose is a natural nanomaterial which can be extracted from plant cell walls."
http://celigraph.com/SciPub/2022v1.0/Par2Sent1	"With its nanometer size in diameter, nanocellulose consists of attractive properties, excellent stiffness, and high surface area [12]."
http://celigraph.com/SciPub/2022v1.0/Par2Sent2	"Nowadays, nanocellulose gets high attraction from research and industries."
http://celigraph.com/SciPub/2022v1.0/Par3Sent1	"The study of nanocellulose is not only about its extraction from biomass, but in various fields."
http://celigraph.com/SciPub/2022v1.0/Par3Sent2	"With its nanometer size in diameter, nanocellulose consists of attractive properties, excellent stiffness, and high surface area [12]."
http://celigraph.com/SciPub/2022v1.0/Par3Sent4	"Nanocellulose can be used in various fields in our life, such as biomedical materials, textiles, and so on."

or

```
select distinct ?t where {?s rdf:type :Section .
  ?s sp:secNumber ?n .
  ?s sp:containsFragment ?i .
  ?i sp:text ?t
  filter(?n = "2"^^xsd:nonNegativeInteger) .}
```

t
"2. Lignocellulose biomass"
"Cell wall structure of lignocellulosic biomass mainly consists of three kinds of polymer, i.e. lignin, hemicellulose, and cellulose."
"Lignin represents about 10–25% by weight of dry lignocellulosic biomass [6–8]."
"In plant cell walls, lignin serves as the binder which holds between and around cellulose and hemicellulose complex (Fig. 1)"

## Part D: Queries about author and organization

### 22. List the organizations

```
select * where {?o rdf:type :Organization .
?o :text ?r
}
```

The screenshot shows the Cellograph interface with a query editor containing the SPARQL code. Below it is a table with five rows of results. The columns are labeled 'o' and 'r'. The first row shows 'http://cellograph.com/SciPub/2022v1.0/Organization1' and its value 'Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan'. The second row shows 'http://cellograph.com/SciPub/2022v1.0/Organization3' and its value 'Department of Chemical Technology, Chulalongkorn University, Bangkok 10330, Thailand'. The third row shows 'http://cellograph.com/SciPub/2022v1.0/Organization4' and its value 'Department of Chemical Engineering, Taiyuan University of Technology, Taiyuan 030024, China'. The fourth row shows 'http://cellograph.com/SciPub/2022v1.0/Organizations5' and its value 'Institute of Industrial Chemistry and Energy Technology, Shenyang University of Chemical Technology (SY UCT), Shenyang 110142, China'.

	o	r
1	<a href="http://cellograph.com/SciPub/2022v1.0/Organization1">http://cellograph.com/SciPub/2022v1.0/Organization1</a>	"Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan"
2	<a href="http://cellograph.com/SciPub/2022v1.0/Organization3">http://cellograph.com/SciPub/2022v1.0/Organization3</a>	"Department of Chemical Technology, Chulalongkorn University, Bangkok 10330, Thailand"
3	<a href="http://cellograph.com/SciPub/2022v1.0/Organization4">http://cellograph.com/SciPub/2022v1.0/Organization4</a>	"Department of Chemical Engineering, Taiyuan University of Technology, Taiyuan 030024, China"
4	<a href="http://cellograph.com/SciPub/2022v1.0/Organizations5">http://cellograph.com/SciPub/2022v1.0/Organizations5</a>	"Institute of Industrial Chemistry and Energy Technology, Shenyang University of Chemical Technology (SY UCT), Shenyang 110142, China"

### 23. List the authors

```
select ?n?!?t where {?o rdf:type :PublicationAuthor .
?o :affiliation ?r .
?o :person ?p .
?p :firstName ?n .
?p :lastName ?l .
?r :text ?t .
}
```

The screenshot shows the GraphDB interface with a query editor containing the SPARQL code. Below it is a table with seven rows of results. The columns are labeled 'n', 'r', 'l', and 't'. The first row shows 'Pathnya' and 'Prasert' as 'Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan'. The second row shows 'Rachayacharen' as 'Department of Chemical Technology, Chulalongkorn University, Bangkok 10330, Thailand'. The third row shows 'Xiaoging' and 'Hao' as 'Department of Chemical Engineering, Taiyuan University of Technology, Taiyuan 030024, China'. The fourth row shows 'Guoqing' and 'Rui' as 'Institute of Industrial Chemistry and Energy Technology, Shenyang University of Chemical Technology (SY UCT), Shenyang 110142, China'. The fifth row shows 'Abulit' and 'Abubakar' as 'Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan'. The sixth row shows 'Donging' and 'Qian' as 'Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan'. The seventh row shows 'Duoqing' and 'Qian' as 'Department of Renewable Energy, Institute of Regional Innovation (IRI), Hirosaki University, 2-1-3, Matsubara, Aomori 080-0815, Japan'.

n	r	l	t
1 "Pathnya" "Prasert"	"Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan"		
2 "Rachayacharen"		"Department of Chemical Technology, Chulalongkorn University, Bangkok 10330, Thailand"	
3 "Xiaoging" "Hao"		"Department of Chemical Engineering, Taiyuan University of Technology, Taiyuan 030024, China"	
4 "Guoqing" "Rui"		"Institute of Industrial Chemistry and Energy Technology, Shenyang University of Chemical Technology (SY UCT), Shenyang 110142, China"	
5 "Abulit" "Abubakar"		"Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan"	
6 "Donging" "Qian"		"Graduate School of Science and Technology, Hirosaki University, 1-Bunkyocho, Hirosaki 036-8560, Japan"	
7 "Duoqing" "Qian"		"Department of Renewable Energy, Institute of Regional Innovation (IRI), Hirosaki University, 2-1-3, Matsubara, Aomori 080-0815, Japan"	

### 24. What about the corresponding author?

```
select ?l?f?m where {?o :hasCorrespondingAuthor ?p .
?p :person ?a .
?a :firstName ?f .
?a :lastName ?l .
?a :email ?m .
```

The screenshot shows the Cellograph interface with a query editor containing the SPARQL code. Below it is a table with one row of results. The columns are labeled 'l', 'f', and 'm'. The row shows 'Guan' as the person, 'Guoqing' as the email, and 'guan@hirosaki-u.ac.jp' as the email address.

l	f	m
1 "Guan"	"Guoqing"	"guan@hirosaki-u.ac.jp"