

---

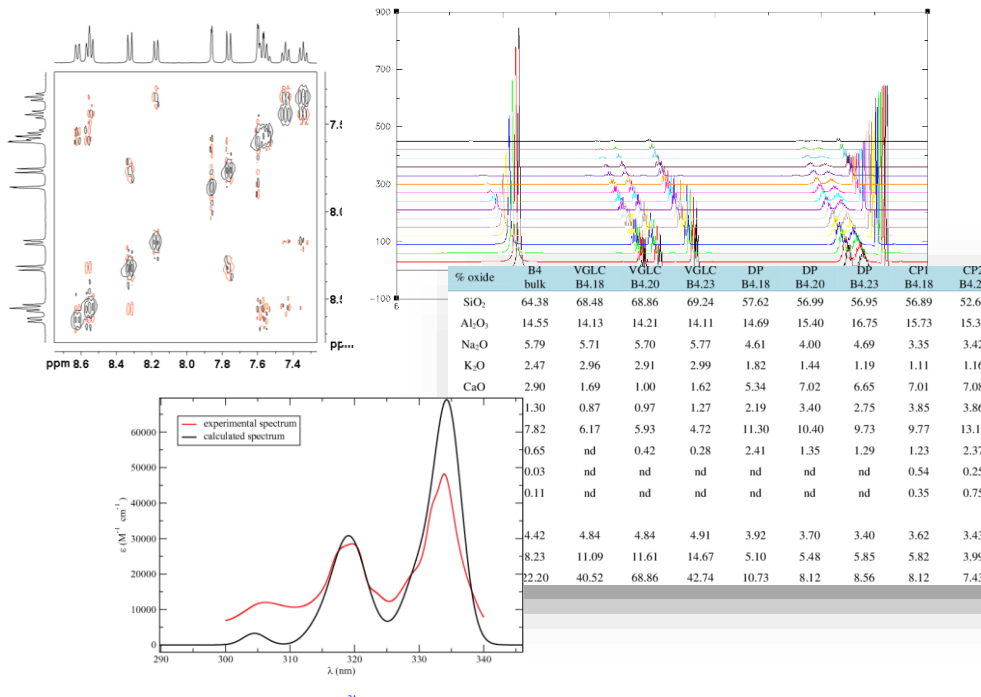
LEIBNIZ-INFORMATIONSZENTRUM  
TECHNIK UND NATURWISSENSCHAFTEN  
UNIVERSITÄTSBIBLIOTHEK



# Terminologien, Metadaten, Forschungsdaten - Dienste für Forschungsdaten-Infrastrukturen

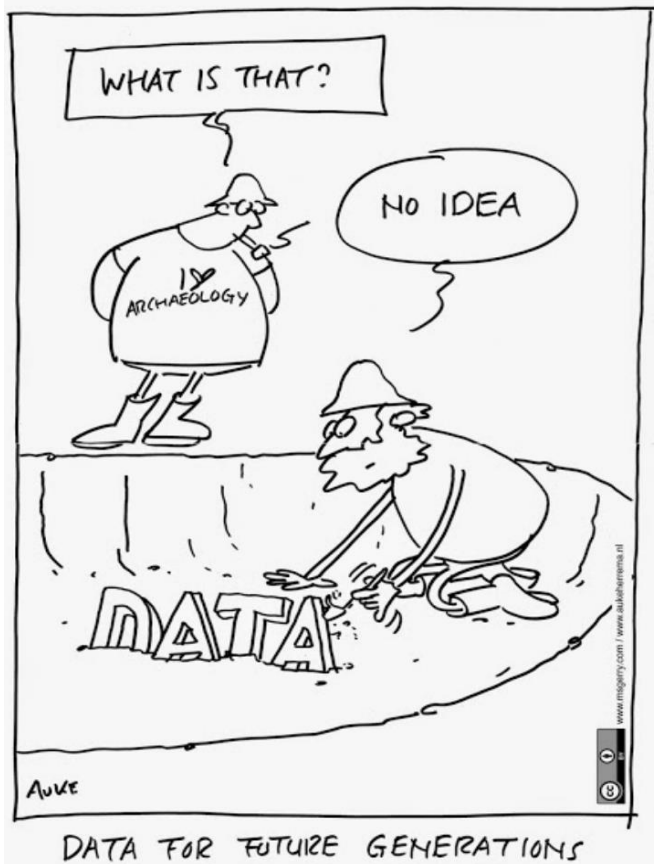
8. Bibliothekskongress, Leipzig  
31. Mai 2022  
Dr. Oliver Koepler, TIB Hannover

# So viele Forschungsdaten



Bildnachweis: <http://chem.ch.huji.ac.il/nmr/techniques/2d/noesy/noesy.html>, <http://www2.chem.uic.edu/nmr/experiments/kinetics.html>, [http://faculty.sdmiramar.edu/garces/LabMatters/Instruments/AA/AAS\\_instrument/AASInstruments.htm](http://faculty.sdmiramar.edu/garces/LabMatters/Instruments/AA/AAS_instrument/AASInstruments.htm)  
 D'Abramo M. et al (2014), Journal of chemical physics 2014, DOI:10.1063/1.4871626, Botto, Lia et al (2015). Pyroclasts of the First Phases of the Explosive-Effusive PCCVC Volcanic Eruption: Physicochemical Analysis. Advances in Materials Physics and Chemistry. 05. 302-315. 10.4236/ampc.2015.58030.  
<https://digitalbevaring.dk/>

## Forschungsdatenmanagement (FDM) ?



### FAIR Data Prinzipien

- Findable
- Accessible
- Interoperable
- Reusable

„Leitlinien zur Sicherung guter wissenschaftlicher Praxis“  
der Deutschen Forschungsgemeinschaft (DFG), seit 3.  
August 2019 in Kraft

Wilkinson, M. D., Dumontier, M., Aalbersberg, I. J. J., et al The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* 3, 160018 (2016).

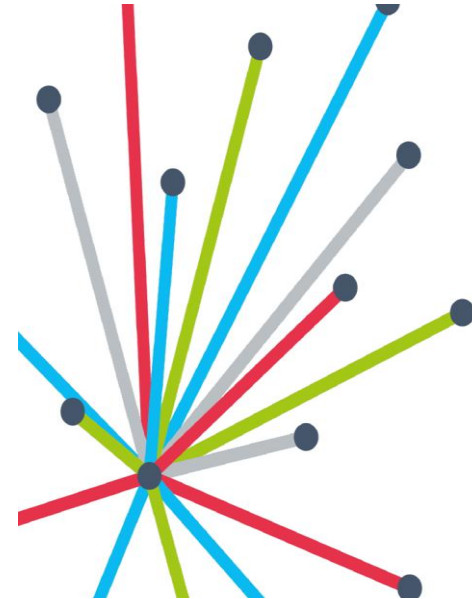
# FDM - Dienste, Initiativen, Infrastrukturen



- Vernetzung existierender Infrastrukturen und Services, schließen von Lücken durch neue Services
- Bedarfsgerechte, wissenschaftsgeleitete Entwicklung
- Übergreifende, interdisziplinäre Standards und Interoperabilität schaffen
- Nationaler Hub für internationale Anbindung an z. B. EOSC

### Ein paar Zahlen

- Bis zu 30 Konsortien, die alle Wissenschaftsbereiche in der NFDI repräsentieren
- Wissenschaftsgeleiteter Bottom-up Prozeß aus den Communities heraus
- Bis zu 70 Mio Euro Förderung pro Jahr in der Endausbaustufe mit 30 Konsortien
- Ca. 2.3 Mio Euro pro Jahr und Konsortium bei 5 + 5 Jahren



# NFDI Konsortien 2020 / 2021



| <h2>Consortia (1<sup>st</sup> round)</h2>  | <h2>Consortia (2<sup>nd</sup> round)</h2>  |                                    |
|--|--|------------------------------------|
| <ul style="list-style-type: none"> <li>• DataPlant</li> <li>• GHGA</li> <li>• KonsortSWD</li> <li>• NFDI4BioDiversity</li> <li>• NFDI4Cat</li> <li>• NFDI4Chem</li> <li>• NFDI4Culture</li> <li>• NFDI4Health</li> <li>• NFDI4Ing</li> </ul> | <ul style="list-style-type: none"> <li>• BERD@NFDI</li> <li>• DAPHNE4NFDI</li> <li>• FAIRmat</li> <li>• MaRDI</li> <li>• NFDI4DataScience</li> <li>• NFDI4Earth</li> <li>• NFDI4Microbiota</li> <li>• NFDI-MatWerk</li> <li>• PUNCH4NFDI</li> <li>• Text+</li> </ul> | <p>(22 proposals, 9 accepted)</p>  |
| <p>(22 proposals, 9 accepted)</p>  | <p>(17 proposals, 10 accepted)</p>   | <p>(17 proposals, 10 accepted)</p> |

## Bibliotheken als Akteure bei NFDI

### Hinweis

Bodmann, Laura, Hartl, Nathalie, Jansen, Lukas, Lübke, Eva, Seitz-Moskaliuk, Hendrik, Sure-Vetter, York, Wössner, Elena,  
Bibliotheken als Akteure bei NFDI. Herausforderungen, Chancen, Zukunftsaussichten,  
**Zeitschrift für Bibliothekswesen und Bibliographie 2022**, 69, 1-2, S. 18-25

<http://dx.doi.org/10.3196/1864295020691244>



# TIB Beteiligungen über NFDI Förderrunden

Seit 24. März TIB Mitglied im NFDI e.V.  
207 Vereinsmitglieder (Stand 06/2022)

2020

TIB



NFDI<sub>4</sub>Chem  
ENHANCE YOUR DATA.

CnFDI  
CULTURE

NFDI4ing

Förderung seit 01. Oktober 2020

## TIB Schwerpunkte

- Terminologie Service
- Ontologie Entwicklung
- ORKG
- Data Search
- FDM Training
- Metadaten
- PID-Service
- AV-Portal
- Leibniz Data Manager (LDM)

2021

TIB



FAIRmat

NFDI<sub>4</sub> DataScience

NFDI<sub>4</sub>Earth

NFDI<sub>4</sub>MICROBIOTA

PUNCH  
4 NFDI

Förderung seit 01. Oktober 2021

2023

TIB



nfdi4phys

nfdi4  
energy

NFDI<sub>4</sub>MOBILITY  
National Research Data Infrastructure for Mobility Technology

NFDI<sub>4</sub> Objects

METHODS

Eingereichte Anträge November 2021



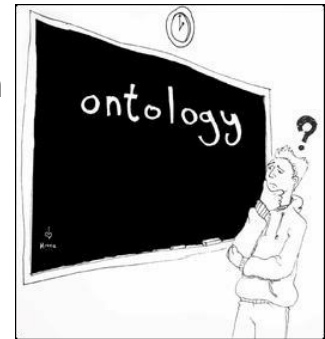
# Terminology Service

## Terminology Service – eine Definition

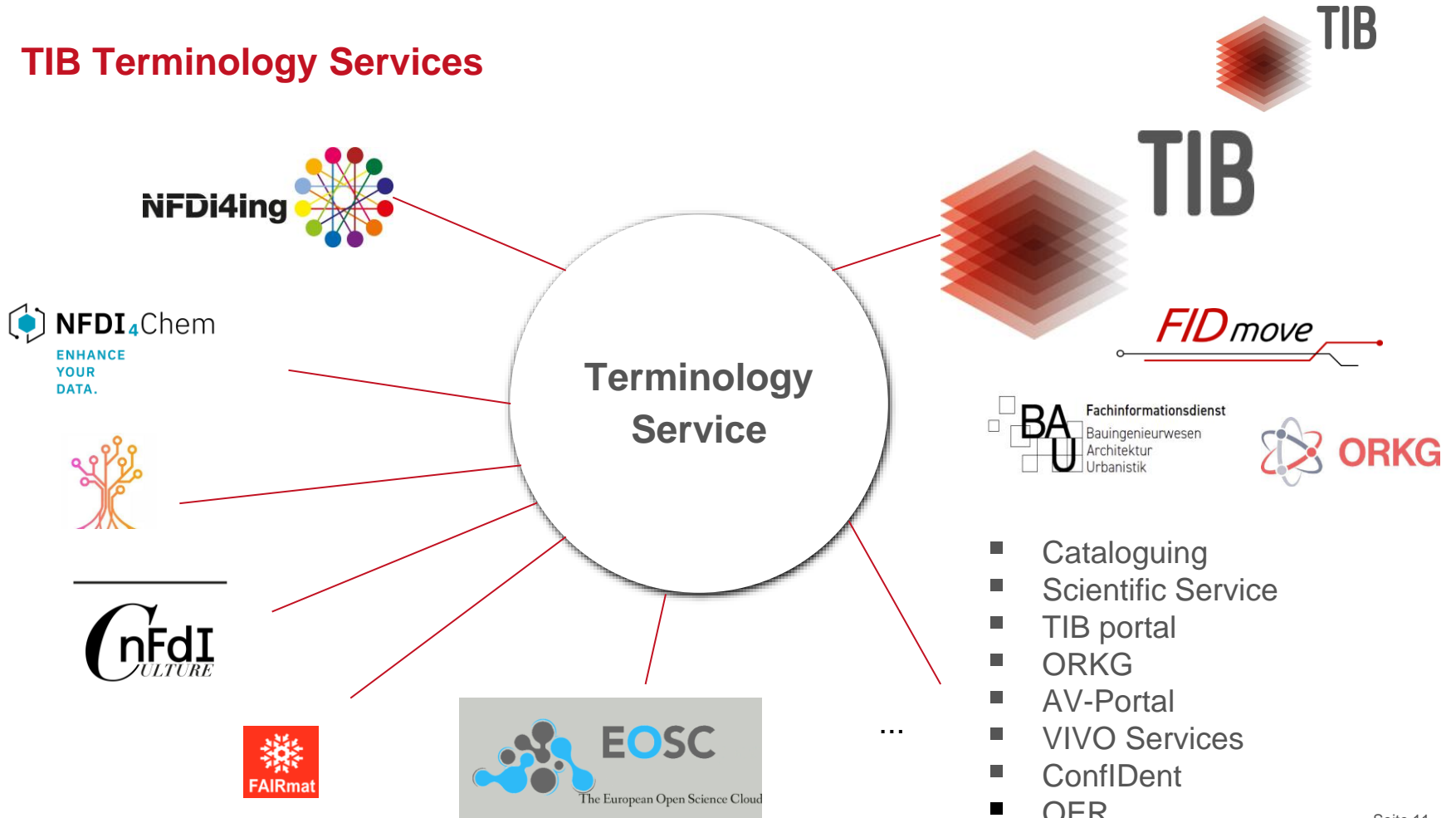
Im Kern ist der Terminology Service ein Repository für Terminologien, kontrollierte Vokabulare oder Ontologien, das einen zentralen Einstiegspunkt für disziplin- oder projektspezifische Kollektionen. Menschliche Nutzer können die Kollektionen über die Benutzeroberfläche durchsuchen und visualisieren, während Computer und Services programmatisch über eine API auf die Ontologien zugreifen können.

Der Terminology Service wird modular ergänzt um Entwicklungs- und Kuratierungswerkzeugen, Visualisierungswerkzeuge, Speicher- Archivierungsservices, Benachrichtigungsdienste oder Veröffentlichungsdienste.

Die Kuratierungswerkzeuge können je nach den Bedürfnissen der wissenschaftlichen Community und dem Erfahrungsstand des Benutzers variieren. Speicherung und Veröffentlichung können je nach Datenschutz- und Lizenzfragen variieren.



# TIB Terminology Services



# TIB Terminology Service Überblick

## Inhalte

- multi-domain content
- conceptual and linguistic information
- semantic specifications on domain-specific concepts
- original content → new ontologies
- 3rd party vocabularies
- metadata

## Service

- technical support
- training & consultation
- vocabulary services and curation
- legal issues & licensing/ licenses

## Technische Funktionalität

- terminology publishing & development
- terminology mapping
- human-friendly browsing & look-up
- machine-readability & explicit semantics
- terminology use in web applications
- visualization
- vocabulary statistics, quality indicators & quality checks
- syntax checks
- coherence and consistency checks
- metadata management
- export & format conversion

# TIB Terminology Service - Module

## Kuratierung

Qualitätskriterien für Auswahl  
Gemeinsame Ontologie Entwicklung



Issue tracking  GitLab

## Lookup & Suche

Benutzeroberfläche für menschliche  
Benutzer  
API Zugriff für Services



WebVOWL

API für NFDI4 Services

## Publikation / Archiv

Persistente Verfügbarkeit von Terminologien  
Archivierung, Versionierung



NFDI4Culture

# Benutzeroberfläche

# TIB Terminology Service



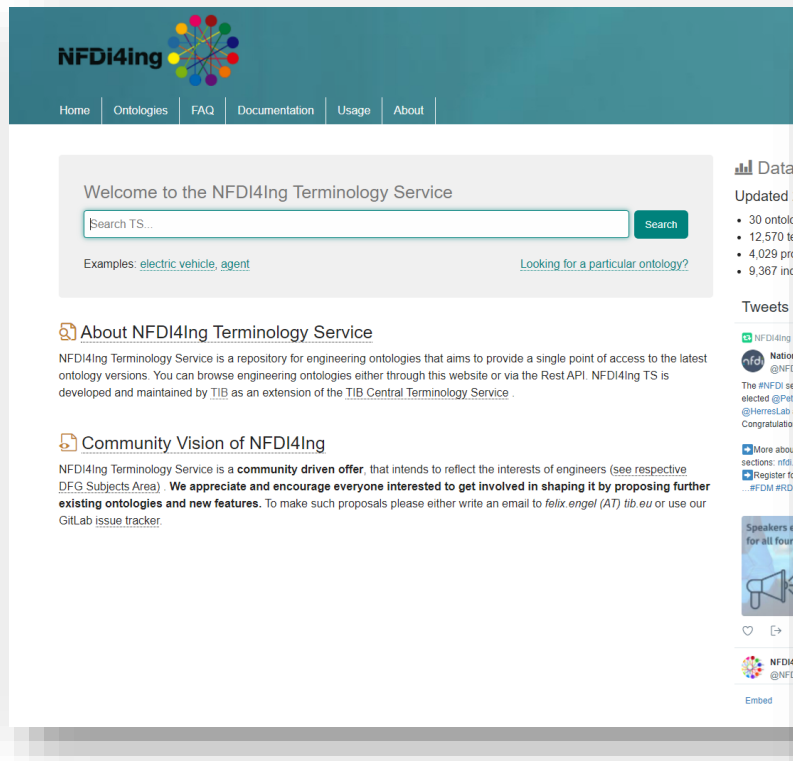
The screenshot displays the TIB Terminology Service interface. At the top, there is a navigation menu with 'Home', 'Ontologies', 'FAQ', 'Documentation', and 'About'. Below the menu, a search bar is present with the text 'Welcome to the TIB Terminology Service' and 'Search TS...'. A dropdown menu for 'Collection' is set to '-- select a collection --'. A 'Show' dropdown is set to '10'. The main content area is titled 'List of NFDI4ING ontologies in TIB Terminology Service' and contains a table of ontology entries.

| Ontology Name  | Short name  | Description and Classifications  | Loaded                       | Action   |
|--|-------------|--|------------------------------|--|
| <a href="#">Basic Formal Ontology</a>  | <b>BFO</b>  | The upper level ontology upon which OBO Foundry ontologies are built.<br>collection: NFDI4CHEM - NFDI4ING -  | Fri Apr 15 08:14:45 GMT 2022 | <a href="#">Search</a><br><a href="#">Terms</a><br><a href="#">Properties</a><br><a href="#">Individuals</a><br><a href="#">Download</a> |
| <a href="#">Basisklassifikation</a>  | <b>bk</b>   | German decimal classification system based on the Dutch Basic Classification (NBC)<br>collection: FID BAUdigital - FID move - NFDI4ING -   | Thu Apr 21 21:27:06 GMT 2022 | <a href="#">Search</a><br><a href="#">Terms</a><br><a href="#">Properties</a><br><a href="#">Individuals</a><br><a href="#">Download</a> |
| <a href="#">Bioinformatics operations, data types, formats, identifiers and topics</a> | <b>EDAM</b> | EDAM is a simple ontology of well established, familiar concepts that are prevalent within bioinformatics, including types of data and data identifiers, data formats, operations and topics. EDAM provides a set of terms with synonyms and definitions - organised into an intuitive hierarchy for convenient use.<br>collection: NFDI4ING - NFDI4CHEM -   | Fri Apr 15 08:56:23 GMT 2022 | <a href="#">Search</a><br><a href="#">Terms</a><br><a href="#">Properties</a><br><a href="#">Individuals</a><br><a href="#">Download</a> |
| <a href="#">Building Topology Ontology</a>   | <b>bot</b>  | The Building Topology Ontology (BOT) is a minimal ontology for describing the core topological concepts of a building.<br>collection: NFDI4ING - NFDI4CULTURE - FID BAUdigital -   | Fri Apr 15 08:14:51 GMT 2022 | <a href="#">Search</a><br><a href="#">Terms</a><br><a href="#">Properties</a><br><a href="#">Individuals</a><br><a href="#">Download</a> |
| <a href="#">Data Privacy Vocabulary (DPV)</a>  | <b>dpv</b>  | The Data Privacy Vocabulary (DPV) provides terms (classes and properties) to describe and represent information related to processing of personal data based on established requirements such as for the EU General Data Protection Regulation (GDPR). The DPV is structured as a top-down hierarchical vocabulary with the core or base concepts of personal data categories, purposes of processing and types of | Fri Apr 15 08:55:57 GMT 2022 | <a href="#">Search</a><br><a href="#">Terms</a><br><a href="#">Properties</a><br><a href="#">Individuals</a>                             |

93 Ontologien  
686,445 Terme  
13,345 Properties  
105,602 Individuen

<https://service.tib.eu/ts4tib>

# Community Instanzen



**NFDI4ing**

Home | Ontologies | FAQ | Documentation | Usage | About

Welcome to the NFDI4ing Terminology Service

Search TS...

Examples: [electric\\_vehicle](#), [agent](#) [Looking for a particular ontology?](#)

**About NFDI4ing Terminology Service**

NFDI4ing Terminology Service is a repository for engineering ontologies that aims to provide a single point of access to the latest ontology versions. You can browse engineering ontologies either through this website or via the RestAPI. NFDI4ing TS is developed and maintained by TIB as an extension of the TIB Central Terminology Service.

**Community Vision of NFDI4ing**

NFDI4ing Terminology Service is a **community driven offer**, that intends to reflect the interests of engineers (see respective DFG Subjects Area). **We appreciate and encourage everyone interested to get involved in shaping it by proposing further existing ontologies and new features.** To make such proposals please either write an email to [felix.engel@tib.eu](mailto:felix.engel@tib.eu) or use our [GitLab issue tracker](#).

**Data**

Updated 27 Mai 2022 15:53

- 30 ontologies
- 12,570 terms
- 4,029 properties
- 9,387 individuals

**Tweets by @NFDI4ing**

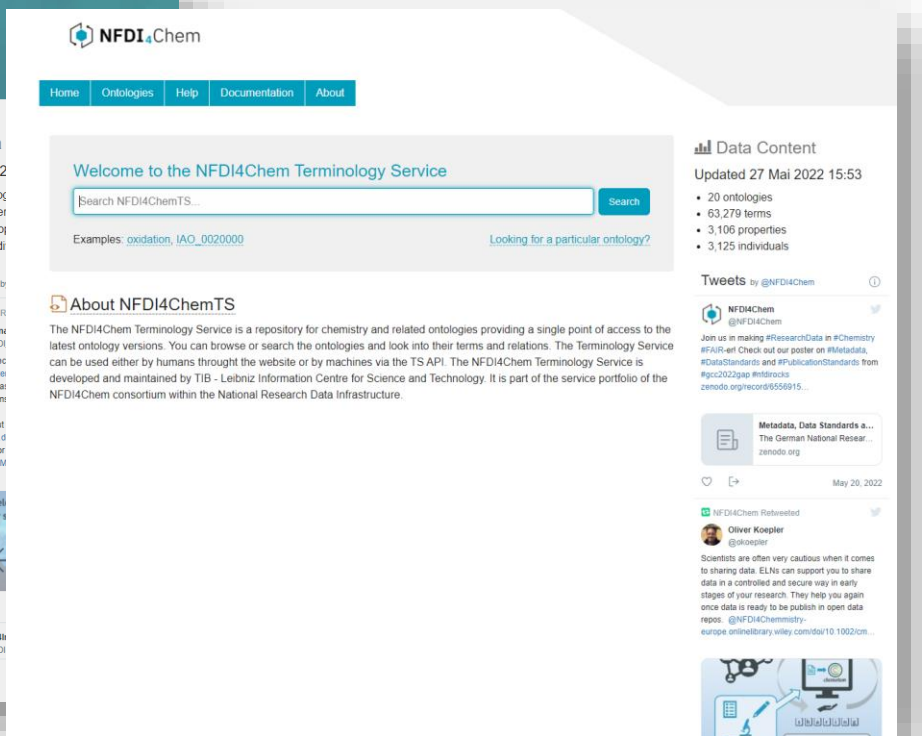
NFDI4ing R  
Nation @NFDI  
The #NFDI sec  
elected @Petra  
@HerrestLab at  
Congratulation

More about sections: nfdi4  
Register for ... NFDI4 #RDM

Speakers ei  
for all four

NFDI4 @NFDI  
Embed

<https://terminology.nfdi4ing.de/>



**NFDI4Chem**

Home | Ontologies | Help | Documentation | About

Welcome to the NFDI4Chem Terminology Service

Search NFDI4ChemTS...

Examples: [oxidation](#), [IAQ\\_0020000](#) [Looking for a particular ontology?](#)

**About NFDI4ChemTS**

The NFDI4Chem Terminology Service is a repository for chemistry and related ontologies providing a single point of access to the latest ontology versions. You can browse or search the ontologies and look into their terms and relations. The Terminology Service can be used either by humans through the website or by machines via the TS API. The NFDI4Chem Terminology Service is developed and maintained by TIB - Leibniz Information Centre for Science and Technology. It is part of the service portfolio of the NFDI4Chem consortium within the National Research Data Infrastructure.

**Data Content**

Updated 27 Mai 2022 15:53

- 20 ontologies
- 63,279 terms
- 3,106 properties
- 3,125 individuals

**Tweets by @NFDI4Chem**

NFDI4Chem @NFDI4Chem  
Join us in making #ResearchData in #Chemistry #I4R-ent Check out our poster on #Metadata #DataStandards and #PublicationStandards from #gc2022gap #entdocs zenodo.org/record/6556915...


Metadata, Data Standards a...  
The German National Resear...  
zenodo.org  
May 20, 2022

NFDI4Chem Retweeted  
Oliver Koepfer @koepfer  
Scientists are often very cautious when it comes to sharing data. ELNs can support you to share data in a controlled and secure way in early stages of your research. They help you again once data is ready to be publish in open data repos. @NFDI4Chemterminology europe.emblibrary.wiley.com/dsi/10.1002/cm...

<https://terminology.nfdi4chem.de/>



# TIB Terminology Service – Blick in die Ontologien



**TIB** LEIBNIZ INFORMATION CENTRE FOR SCIENCE AND TECHNOLOGY UNIVERSITY LIBRARY

Home | Ontologies | FAQ | Documentation | About

## Chemical Methods Ontology

CHMO, the chemical methods ontology, describes methods used to collect data in chemical experiments, such as mass spectrometry and electron microsc and separate material for further analysis, such as sample ionisation, chromatography, and electrophoresis synthesise materials, such as epitaxy and cont deposition It also describes the instruments used in these experiments, such as mass spectrometers and chromatography columns. It is intended to be cot to the Ontology for Biomedical Investigations (OBI).

Search CHMO

Browse Terms | Browse Properties

- continuant
  - continuant flat boundary
  - boundary between portions of material
    - liquid junction
- process
  - absorption of material
  - absorption of radiation
  - adverse laboratory event
  - experimental planning process
    - experimental plan creation
    - experimental plan revision
      - hazard reduction
    - risk management planning process
      - control banding
      - hazard analysis
      - risk assessment
  - planned process

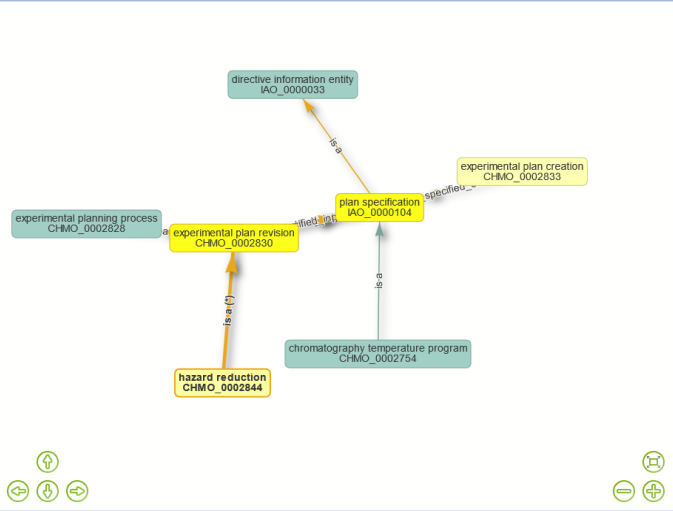
### TS Ontology inform

**Ontology IRI:** <http://purl.obolibrary.org/obo/chmo.o>  
**Version IRI:** <http://purl.obolibrary.org/obo/chmo/04.19/chmo.owl>  
**Ontology ID:** chmo  
**Version:** 2022-04-19  
**Number of terms:** 3093  
**Last loaded:** Wed May 04 21:25:02  
**Creator:** Royal Society of Chemistry  
**Classifications:**  
**Class [collection]:**  
 collection:  
 NFDI4CHEM  
**License Label:** CC-BY

[Original Ontology info](#)

TS > CHMO > CHMO\_0002844

Visualized term: hazard reduction ([http://purl.obolibrary.org/obo/CHMO\\_0002844](http://purl.obolibrary.org/obo/CHMO_0002844))



| Relationship         | Color  | Visibility                          |
|----------------------|--------|-------------------------------------|
| Extended nodes (*)   | Red    | -                                   |
| is a                 | Teal   | <input checked="" type="checkbox"/> |
| has_specified_output | Yellow | <input checked="" type="checkbox"/> |
| has_specified_input  | Purple | <input checked="" type="checkbox"/> |
| Select/Deselect all  |        | <input type="checkbox"/>            |

List of extended nodes (\*):

- hazard reduction (CHMO\_0002844)
- experimental plan revision (CHMO\_0002830)
- plan specification (IAO\_000104)
- experimental plan creation (CHMO\_0002833)
- chromatography temperature program (CHMO\_0002754)
- directive information entity (IAO\_0000033)

# Schnittstellen

# Nutzung durch Mensch und Maschine

## Browsing und Suche für Menschen

NFDI4Chem

Home | Ontologies | Help | Documentation | About

NFDI4ChemTS / MOP | MOP | MOP:0000568 | Copy

oxidation  Search

[http://purl.obolibrary.org/obo/MOP\\_0000568](http://purl.obolibrary.org/obo/MOP_0000568) Copy

The complete, net removal of one or mole electrons from a molecular entity, corresponding to an increase in the oxidation number of any atom within any substrate. [ <https://doi.org/10.1351/goldbook.O04362> ]

Synonyms: [de-electronation](#)

Tree view | Term mappings

- process
  - molecular process
    - oxidation

Graph view | Reset tree | Show all siblings

**created by**  
batchelorc

**creation date**  
2009-06-01T06:01:47Z

**id**  
MOP:0000568

**Term relations**

**Subclass of:**

- molecular process

## Zugang für Maschinen

```

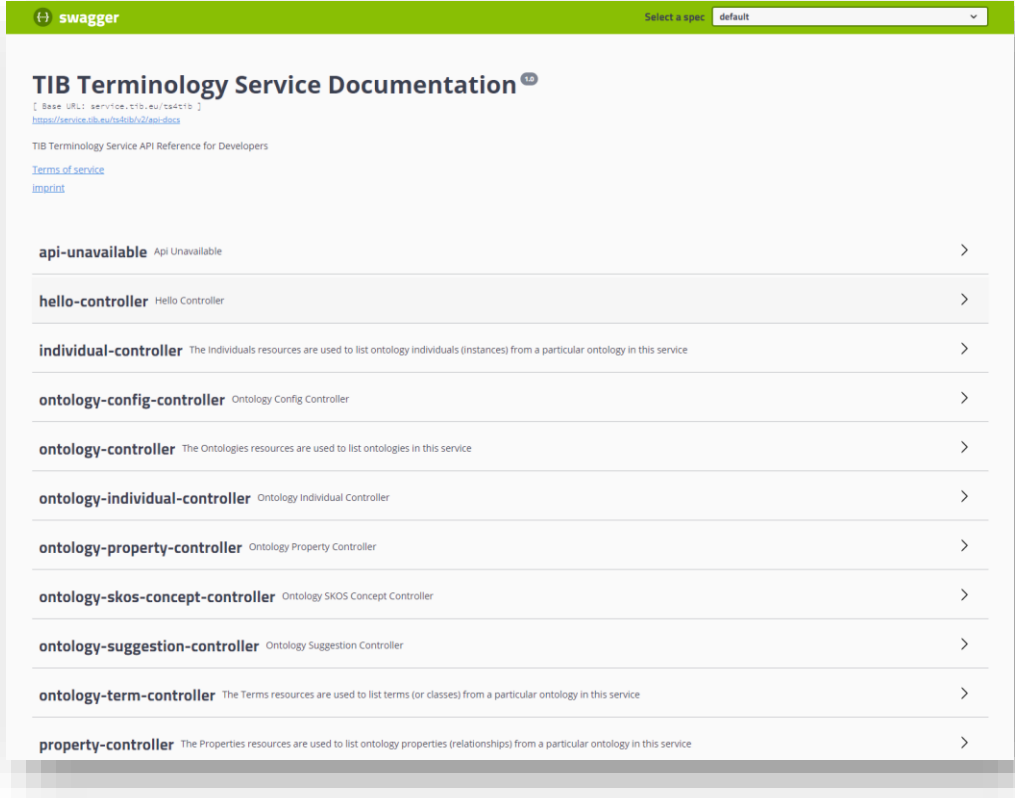
{
  "_embedded": {
    "terms": {
      "0": {
        "iri": "http://purl.obolibrary.org/obo/MOP_0000568",
        "label": "oxidation",
        "description": {
          "0": "The complete, net removal of one or mole electrons from a molecular entity, corresponding to an increase in the oxidation number of any atom within any substrate."
        },
        "annotation": {
          "created_by": {
            "0": "batchelorc"
          },
          "creation_date": [...],
          "id": [...],
          "synonyms": {
            "0": "de-electronation"
          },
          "ontology_name": "mop",
          "ontology_prefix": "MOP",
          "ontology_iri": "http://purl.obolibrary.org/obo/mop.owl",
          "is_obsolete": false,
          "term_replaced_by": null,
          "is_defining_ontology": false,
          "has_children": true,
          "is_root": false,
          "short_form": "MOP_0000568",
          "obo_id": "MOP:0000568",
          "in_subset": null,
          "obo_definition_citation": {
            "0": {
              "definition": "The complete, net removal of one or mole electrons from a molecular entity, corresponding to an increase in the oxidation number of any atom within any substrate."
            },
            "oboXrefs": {
              "0": {}
            }
          }
        }
      }
    }
  }
}

```

[https://service.tib.eu/ts4tib/api/terms?short\\_form=MOP\\_0000568](https://service.tib.eu/ts4tib/api/terms?short_form=MOP_0000568)

# API Dokumentation für Service Provider

- Frei zugängliche API
- Service-to-Service Kommunikation
- Alle Ontologien abrufbar
- Filtern nach Kollektionen

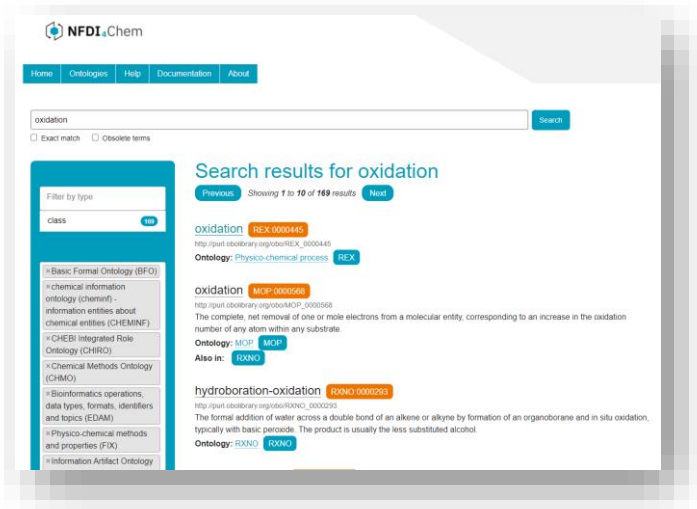


The screenshot shows the Swagger UI interface for the TIB Terminology Service. At the top, there is a green header with the 'swagger' logo and a dropdown menu for selecting a specification, currently set to 'default'. Below the header, the title 'TIB Terminology Service Documentation' is displayed, followed by the base URL and a link to the API documentation. The main content area lists several API endpoints, each with a brief description and a right-pointing arrow indicating further details:

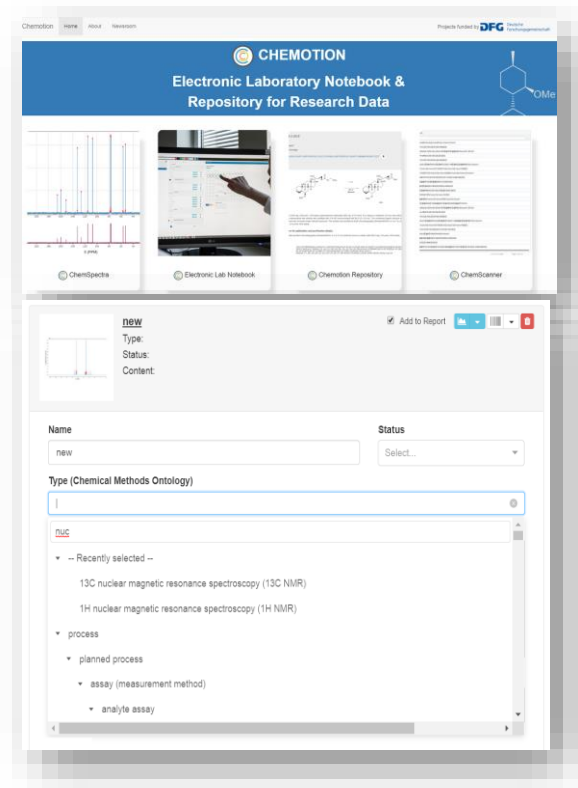
- api-unavailable** Api Unavailable
- hello-controller** Hello Controller
- individual-controller** The Individuals resources are used to list ontology individuals (instances) from a particular ontology in this service
- ontology-config-controller** Ontology Config Controller
- ontology-controller** The Ontologies resources are used to list ontologies in this service
- ontology-individual-controller** Ontology individual Controller
- ontology-property-controller** Ontology Property Controller
- ontology-skos-concept-controller** Ontology SKOS Concept Controller
- ontology-suggestion-controller** Ontology Suggestion Controller
- ontology-term-controller** The Terms resources are used to list terms (or classes) from a particular ontology in this service
- property-controller** The Properties resources are used to list ontology properties (relationships) from a particular ontology in this service

<https://service.tib.eu/ts4tib/swagger-ui.html>

# NFDI4Chem Service-to-Service



The screenshot shows the NFDI4Chem search interface. A search bar contains the term "oxidation". Below the search bar, there are filter options for "Exact match" and "Exclude terms". The search results are displayed under the heading "Search results for oxidation", showing 10 of 169 results. The first result is for "oxidation" (REX:000445), with a description: "The complete, net removal of one or more electrons from a molecular entity, corresponding to an increase in the oxidation number of any atom within any substrate." The second result is for "hydroboration-oxidation" (R0NC:000029), with a description: "The formal addition of water across a double bond of an alkene or alkyne by formation of an organoborane and in situ oxidation, typically with basic peroxide. The product is usually the less substituted alcohol."

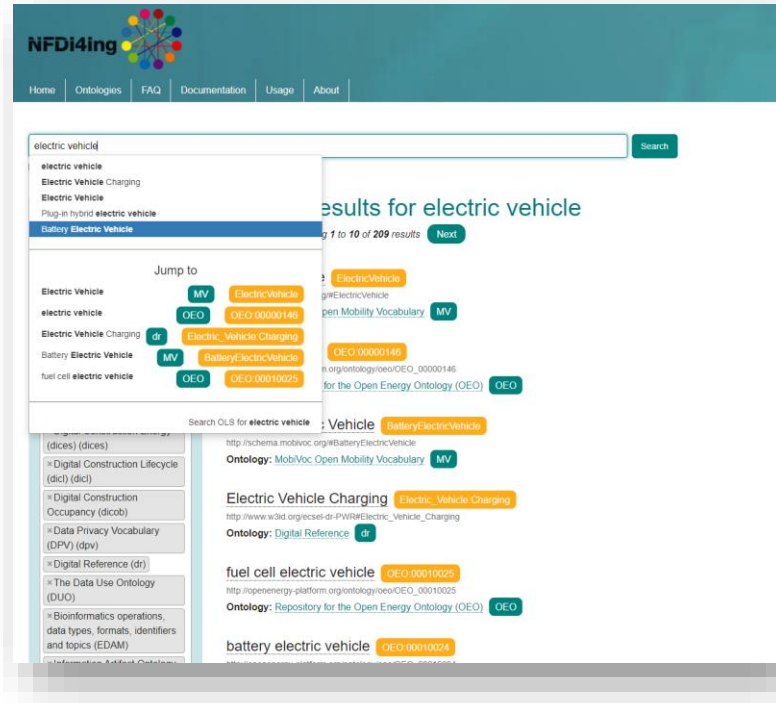


The screenshot shows the CHEMOTION interface, titled "Electronic Laboratory Notebook & Repository for Research Data". It features a navigation bar with "Home", "About", and "Help" options. The main content area displays a grid of four panels: "ChemSpectra", "Electronic Lab Notebook", "Chemotion Repository", and "ChemScanner". Below this grid, there is a detailed view of a "NEW" report, showing fields for "Name", "Type", "Status", and "Content". The "Type" dropdown is set to "13C nuclear magnetic resonance spectroscopy (13C NMR)".

## Semantische Annotation in ELN und Daten Repositorien

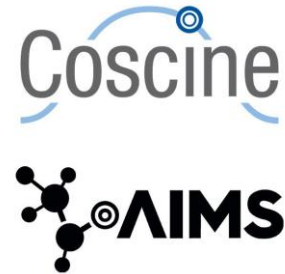


# NFDI4Ing Service-to-Service



The screenshot shows the NFDI4Ing website interface. At the top, there is a navigation bar with links for Home, Ontologies, FAQ, Documentation, Usage, and About. A search bar contains the text 'electric vehicle' and a 'Search' button. Below the search bar, a dropdown menu lists search results: 'electric vehicle', 'Electric Vehicle Charging', 'Electric Vehicle', 'Plug-in hybrid electric vehicle', and 'Battery Electric Vehicle'. The 'Battery Electric Vehicle' result is highlighted. To the right, a larger search results page is visible, titled 'Results for electric vehicle' showing '1 to 10 of 209 results'. It features a 'Jump to' section with a list of terms and their corresponding ontology identifiers (e.g., 'Electric Vehicle' with 'OEO:0000146'). Below this, there are several search results for related terms like 'Electric Vehicle Charging', 'fuel cell electric vehicle', and 'battery electric vehicle', each with its ontology and a 'Next' button.

Collaborative Scientific Integration Environment



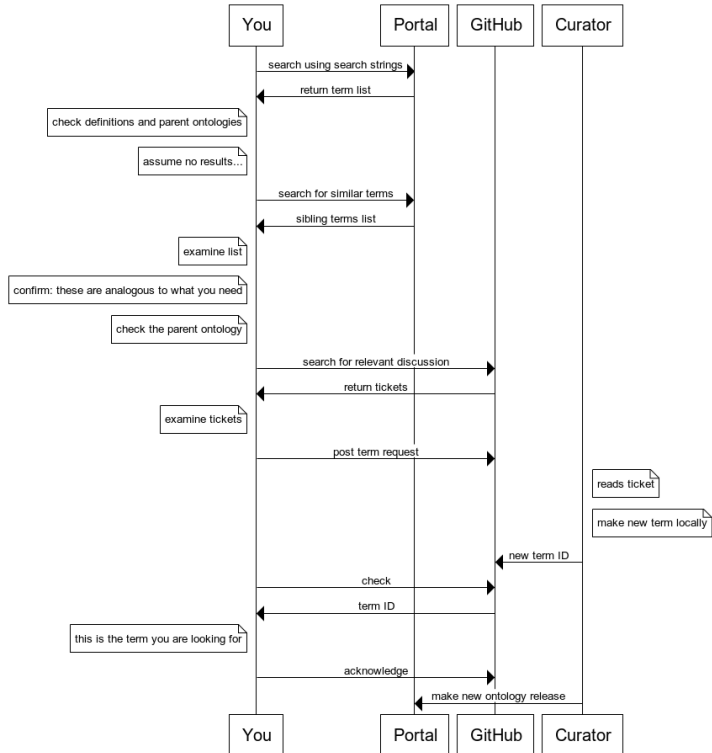
Benutzerdefinierte Metadatenstandards in Form von Anwendungsprofilen

# Kuratierung

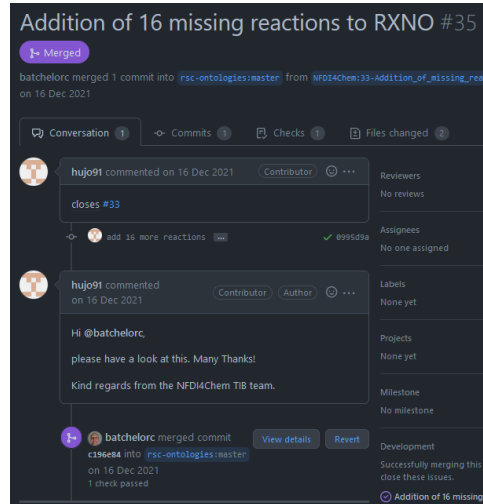
# Ontologie Pflege, community-driven Ergänzungen

## Den richtigen Term finden und wie mit Lücken umgehen

Term search and request workflow



www.websequencediagrams.com



- Zuerst eine gründliche Suche
- Definieren neuer Terme für neue Use Cases
- Herausfinden, welche Ontologie am besten geeignet ist
- Mit den Kuratoren der Ontologie Kontakt aufnehmen
- Bei der Umsetzung helfen

Chris Mungall <https://douroucouli.wordpress.com/2021/07/03/how-select-and-request-terms-from-ontologies/>



# Ontologie Pflege, community-driven Ergänzungen

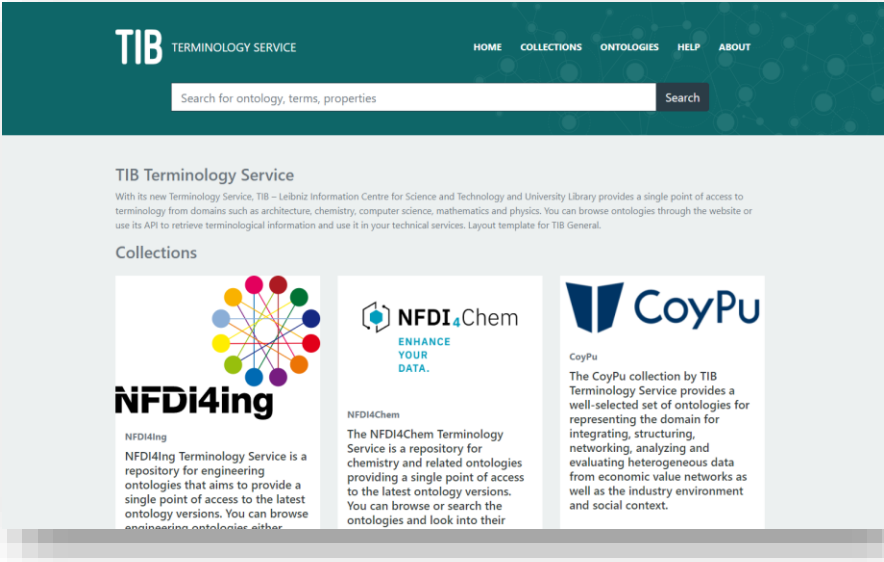


- Viele Ontologien werden auf GitHub gehostet  
→ erleichterte Kollaboration
- Issue anlegen
- Eigene Beiträge via Pull requests
- Ideen für die Einbettung in den Terminology Service
  - Überblick offene Issues
  - Formulare für Term-Ergänzungen
  - Interimslösungen, wenn Terme unmittelbar benötigt werden

The screenshot displays a GitHub issue titled "chmo incorrectly asserts BFO continuant subclass for BFO material entity #11" which is closed. Below it, a comment from DanBerríos discusses the relationship between BFO material entity and independent continuant. Another issue, "#36 Inconsistency due to BFO1.1 use instead of BFO2.0", is open. A comment from StroemPhi explains that the inconsistency arises from the import of BFO1.1 via cheminf-external.owl, which contains "wrong" equivalent axioms. A comment from egonw suggests upgrading to BFO2.0. The right sidebar shows the issue's metadata, including assignees (egonw), labels, projects, milestones, development status, and notifications.

## Nächste Schritte

- Kontinuierliche Integration neuer Inhalte
- Kontinuierliche Vernetzung mit weiteren Services
- Terminology Service 2.0 Frontend
- Integration von Workflows zur Ontologie Kuratierung
- Module
  - Verknüpfung Webprotegé
  - Verknüpfung WebVowl
  - Ontology Mapping



The screenshot shows the TIB Terminology Service website. The header is dark green with the TIB logo and 'TERMINOLOGY SERVICE' on the left, and navigation links (HOME, COLLECTIONS, ONTOLOGIES, HELP, ABOUT) on the right. A search bar is centered below the navigation. The main content area is light gray and features a 'TIB Terminology Service' section with a brief description. Below this is a 'Collections' section with three featured collections: NFDI4ing, NFDI4Chem, and CoyPu. Each collection has a logo and a short description.

**TIB** TERMINOLOGY SERVICE

HOME COLLECTIONS ONTOLOGIES HELP ABOUT

Search for ontology, terms, properties

**TIB Terminology Service**

With its new Terminology Service, TIB – Leibniz Information Centre for Science and Technology and University Library provides a single point of access to terminology from domains such as architecture, chemistry, computer science, mathematics and physics. You can browse ontologies through the website or use its API to retrieve terminological information and use it in your technical services. Layout template for TIB General.

**Collections**

**NFDI4ing**

NFDI4ing  
NFDI4ing Terminology Service is a repository for engineering ontologies that aims to provide a single point of access to the latest ontology versions. You can browse engineering ontologies either

**NFDI<sub>4</sub>Chem**

ENHANCE YOUR DATA.

NFDI4Chem  
The NFDI4Chem Terminology Service is a repository for chemistry and related ontologies providing a single point of access to the latest ontology versions. You can browse or search the ontologies and look into their

**CoyPu**

CoyPu  
The CoyPu collection by TIB Terminology Service provides a well-selected set of ontologies for representing the domain for integrating, structuring, networking, analyzing and evaluating heterogeneous data from economic value networks as well as the industry environment and social context.

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## **Beteiligte TIB Kolleginnen und Kollegen**

**Susanne Arndt**

**Felix Engel**

**Anna Beer**

**Pooya Olazadimi**

**Vatsal Limbachia**

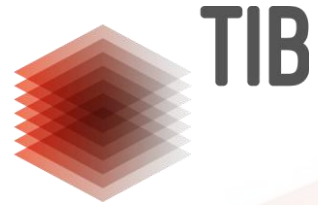
**Giray Tuncay**

**Johannes Hunold**

**Philip Strömert**

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**Vielen Dank**

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