Data Description

1. General Description

The vocabulary on minerals is part of the GBA Thesaurus of the Geological Survey of Austria (Geologische Bundesanstalt, resource.geolba.ac.at) – now part of GeoSphere Austria – and serves to semantically represent geoscientific knowledge. It is a controlled, bilingual vocabulary (German/English) that has been continuously developed since 2010. The vocabulary is based on terms from text, data, and map publications of the Geological Survey of Austria, which are systematically collected, structured, and made digitally accessible.

The Minerals thesaurus project currently includes the most important rock-forming minerals that are relevant for data processing in the fields of geology, petrology, and raw material at the Geological Survey of Austria.

The vocabulary supports the attribution and standardization of geoscientific data and plays a central role in harmonization efforts within the framework of the European INSPIRE Directive. It also actively contributes to the implementation of the FAIR principles (Findable, Accessible, Interoperable, Reusable).

Technically, the vocabulary is available as an RDF/XML file. The included terms are modeled as SKOS concepts with persistent URIs and are classified based on generic terms. Quality assurance and validation of the vocabulary are carried out in accordance with relevant international standards such as SKOS, RDFS, and DCMI.

2. Detail Information

	Details
Vocabulary Name	Minerals
Base URI	http://resource.geolba.ac.at/mineral
Number of SKOS Concepts	798
Publication File Created	18.11.2024
Development Period	2012 – 2022
skos:mappingRelation	- https://www.wikidata.org/wiki - https://www.mindat.org/ - https://www.dbpedia.org/
SPARQL Endpoint	Dedicated SPARQL API for querying the Geologic Time Scale vocabulary

2.1. Content Details

Hierarchy Structure	○ Thematic Area → Concept Scheme → Top Conzept → (Concept) ○ Polyhierarchical relationships are possible.

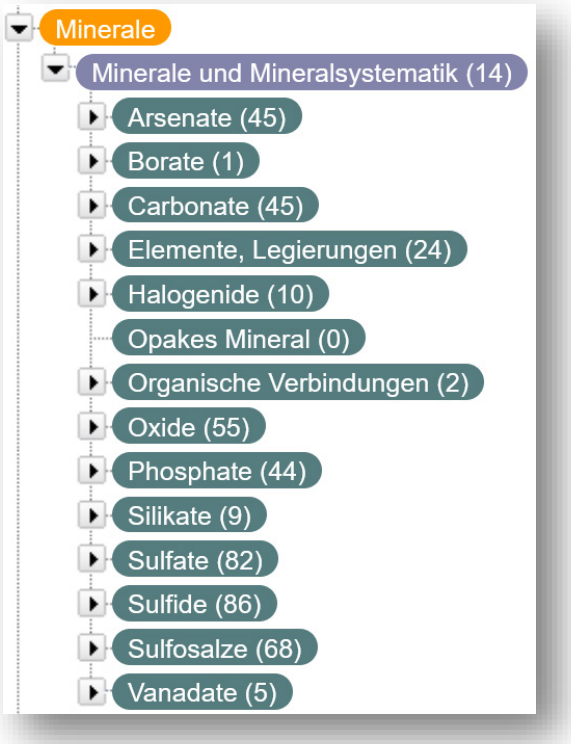

Fig. 1 Knowledge Management Software – Backend Visualization of the Top 3 Hierarchy Levels. Since the defined primary language of the backend system is German, this visualization is only available in German.

Division into 1 Concept Scheme:

- Minerals and mineral systematics
    - The selection was based on a list of minerals and their abbreviations according to the recommendations of the Subcommission on the Systematics of Metamorphic Rocks (SCMR) (Fettes & Desmons, 2007), as well as on the project "Systematic Survey of Mining Sites and Mine Dumps of Mineral Resources in Austria" (Schedl et al., 2009).
    - Additionally, the CNMNC list of mineral names from the International Mineralogical Association (IMA), provided through the RUFF Project, was used as a reference.
    - The classification of the minerals follows the system of Strunz & Nickel (2001) and is based on their chemico- structural characteristics.

3. Maintenance and Further Development

	Details
Responsibility	Editorial team of the GeoSphere Austria Thesaurus: • Technical coordination: Schiegl M. und Linsberger Ch. • Content editing: Hörfarter Ch. • Contact: Thesaurus Feedback
Update Frequency	On an as-needed basis
Planned Changes	Migration of base URIs due to the organizational transition from the Geological Survey of Austria to GeoSphere Austria, extension of the vocabulary for harmonization according to the INSPIRE Directive, structural optimizations, and enhanced documentation of content and relationships.

4. Series Information for the GBA Thesaurus

This publication of the GBA Thesaurus SKOS/RDF vocabulary documents an interim status of the content and technical development and serves to secure the current working state during the organizational transition from the Geological Survey of Austria to GeoSphere Austria. The vocabulary is under ongoing revision and may still contain inconsistencies. Future versions will be published under new GeoSphere-compliant URIs; existing URIs will be permanently redirected.

	Details
Title	GBA Thesaurus – Controlled Vocabularies of the Geological Survey of Austria
Thematic Area	Geosciences
Content Basis	Concepts from text, data, and map publications of the Geological Survey of Austria (since 01.01.2023 GeoSphere Austria)
Background	Based on the legal obligation to implement the European INSPIRE Directive, with the aim of creating a common European geodata infrastructure.

Vocabulary Modules in the Series	The GBA Thesaurus vocabulary system is divided into 8 thematic modules (projects), each of which may contain multiple Concept Schemes: • Geologic Units • Lithology • Geologic Structures • Geologic Time Scale • Lithotectonic Units • Minerals • Mineral Resources • Bibliographic references
Purpose of Use	- INSPIRE-compliant data provision - Harmonization of geoscientific data - Semantic knowledge representation - Attribution of geological data - Implementation of the FAIR data principles
Creator	GeoSphere Austria (before 01.01.2023 Geological Survey of Austria)
Resource Language	German/English
Format	RDF-XML
Standard	SKOS, SPARQL, RDF,DCMI
Basic Ontology	SKOS W3C Standard
Modeling	- (Poly-)hierarchical structure based on SKOS principles (broader, narrower, related) - Handling of synonyms with skos:altLabel.
Specific Relations and Attributes	- The relation dcterms:references is used to link a GBA Thesaurus concept to a bibliographic resource. - Specific attributes for more detailed concept descriptions and visualization (e.g., FOAF depiction, GBA status).
Terms of Usage	Attribution 4.0 International (CC BY 4.0)
Interoperability	Linking to external data sources and standards: - INSPIRE - CGI-GeoSciML - DBPedia - BGS Rock classification - Mindat.org

Software and Validation	- PoolParty Semantic Suite by Semantic Web Company (since 2024 GRAPHWISE) - Version 8.1.8 - Revision 45873
Character Encoding	UTF-8
Used Prefixes (vann:preferredNamespacePrefix)	mlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" xmlns:skos="http://www.w3.org/2004/02/skos/core#" xmlns:skosxl="http://www.w3.org/2008/05/skos-xl#" xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dcterms="http://purl.org/dc/terms/" xmlns:csw="http://semantic-web.at/ontologies/csw.owl#" xmlns:ctag="http://commontag.org/ns#" xmlns:xsd="http://www.w3.org/2001/XMLSchema#" xmlns:foaf="http://xmlns.com/foaf/0.1/" xmlns:cyc="http://sw.cyc.com/concept/" xmlns:cycAnnot="http://sw.cyc.com/CycAnnotations_v1#" xmlns:dbpedia="http://dbpedia.org/resource/">
Lifecycle Information	• The development of the GBA Thesaurus began in 2010. • The first RDF publication released in 2025. • The vocabulary is continuously maintained and further developed within GeoSphere Austria.
Contact	Technical Coordination: Schiegl M. und Linsberger Ch. Content Editing: Hörfarter Ch. General:Thesaurus Feedback
Walkthrough Video	https://www.youtube.com/playlist?list=PLfshul-4XQW9H-k-_Q98eRI5LHfUPGbtc

5. List of Abbreviations

abbrevations	term/description	link
BGS	British Geological Survey	https://www.bgs.ac.uk
CGI-GeoSciML	Commission for the Management and Application of Geoscience Information – GeoSciML standard	https://cgi-iugs.org/project/geosciml/
DBPedia	Crowdsourced community effort to extract structured content from Wikipedia	https://wiki.dbpedia.org/
DCMI	Dublin Core Metadata Initiative	https://www.dublincore.org/
FOAF	Friend of a Friend	http://xmlns.com/foaf/spec/
GBA	Geologische Bundesanstalt (Austria)	https://www.geologie.ac.at/
INSPIRE	Infrastructure for Spatial Information in the European Community (EU-Richtlinie)	https://inspire.ec.europa.eu/
RDF	Resource Description Framework	https://www.w3.org/RDF/
RDFS	RDF Schema	https://www.w3.org/TR/rdf-schema/
SKOS	Simple Knowledge Organization System	https://www.w3.org/2004/02/skos/
SPARQL	SPARQL Protocol and RDF Query Language	https://www.w3.org/TR/sparql11-overview/
URI	Uniform Resource Identifier	https://datatracker.ietf.org/doc/html/rfc3986
UTF-8	Unicode Transformation Format – 8-bit	https://www.unicode.org/faq/utf_bom.html#UTF-8
W3C	World Wide Web Consortium	https://www.w3.org/
XML	Extensible Markup Language	https://www.w3.org/XML/

6. Supplementary Resources and Further Links (as of July 2025)

- *IMA Database of Mineral Properties –. In: rruff.info. RRUFF Project https://rruff.info/ima*
- *Strunz, H. & Nickel, H. E. (2001): Strunz Mineralogical Tables: Chemical-Structural Mineral Classification System. – 9. Auflage, 870 S., Stuttgart 2001, Schweizerbart*

- *Schedl, A., Lipiarski, P., Atzenhofer, B., Heger, H., Reischer, J. (2009): Systematische Erhebung von Bergbauen und Bergbauhalden mineralischer Rohstoffe im Bundesgebiet ('Bergbau-/Haldenkataster') Jahresendbericht Projekt Ü-LG-040F/2006. – Bericht, 18 S., Geologische Bundesanstalt Wien*

- *Fettes, D. & Desmons, J. (Ed.) (2007): Metamorphic rocks: a classification and glossary of terms: recommendations of the International Union of Geological Sciences Subcommission on the Systematics of Metamorphic Rocks. – 244 S., Cambridge 2007, Cambridge University Press.*

- *World Wide Web Consortium (W3C) Simple Knowledge Organisation System (SKOS) – https://www.w3.org/2004/02/skos/*