

# Circular Economy Ontology Network (CEON) - Material Module

## Metadata

### IRI

<http://w3id.org/CEON/ontology/material/>

### Title

Circular Economy Ontology Network (CEON) - Material Module

### Publisher

Onto-DESIDE

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### Date Created

2025-03-20

### Date Issued

2025-06-30

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### Version Iri

<http://w3id.org/CEON/ontology/material/0.4/>

### Version Info

0.4

### Prior Version

0.3

### Preferred Namespace Prefix

ceon-material

### Preferred Namespace Uri

<http://w3id.org/CEON/ontology/material/>

### Description

The Material module of CEON (Circular Economy Ontology Network).

### Covers Requirements

In addition to requirements covered by imported ODPs, covers the following requirements from Onto-DESIDE D3.1: CVN-Resource-2, CVN-ResourceType-4, C3-3, E1-3, E2-4, E5-2, T1-1, T10-2.

In addition to requirements covered by imported ODPs, covers the following requirements from Onto-DESIDE D3.2: CE5-2, C3-3, E1-3, E2-4, E5-2, T1-1, T10-2.

## Classes

### Aluminum<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Aluminum>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

### Boron<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Boron>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

### Cellulose<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Cellulose>

**Sub Class Of** [Material<sup>C</sup>](#)

### Cerium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Cerium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

### Chemical Element<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/ChemicalElement>

**Sub Class Of** [ChemicalSubstance<sup>C</sup>](#)

**Super Class Of**

- [Aluminum<sup>C</sup>](#)
- [Boron<sup>C</sup>](#)
- [Chromium<sup>C</sup>](#)
- [Copper<sup>C</sup>](#)
- [Iron<sup>C</sup>](#)
- [Magnesium<sup>C</sup>](#)
- [Manganese<sup>C</sup>](#)
- [Nickel<sup>C</sup>](#)
- [Niobium<sup>C</sup>](#)
- [RareEarthElement<sup>C</sup>](#)
- [Silicon<sup>C</sup>](#)
- [Titanium<sup>C</sup>](#)
- [Zinc<sup>C</sup>](#)

## Chemical Entity<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/ChemicalEntity>

**Sub Class Of** [resourceODP:Matter<sup>C</sup>](#)

**In Range Of** [hasChemicalEntity<sup>op</sup>](#)

**Super Class Of**  
[ChemicalSubstance<sup>C</sup>](#)  
[MolecularEntity<sup>C</sup>](#)

## Chemical Substance<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/ChemicalSubstance>

**Sub Class Of** [ChemicalEntity<sup>C</sup>](#)

**Super Class Of** [ChemicalElement<sup>C</sup>](#)

## Chromium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Chromium>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Copper<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Copper>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Dysprosium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Dysprosium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Erbium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Erbium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Europium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Europium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Gadolinium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Gadolinium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Holmium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Holmium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Iron<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Iron>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Lanthanum<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Lanthanum>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Lutetium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Lutetium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Magnesium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Magnesium>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Manganese<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Manganese>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Material<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Material>

**Sub Class Of** [resourceODP:Matter<sup>C</sup>](#)

**In Domain Of**  
[hasChemicalEntity<sup>op</sup>](#)  
[hasMaterialComponent<sup>op</sup>](#)

**Restriction** [hasChemicalEntity<sup>op</sup>](#) some [Material<sup>C</sup>](#)

**Super Class Of** [Cellulose<sup>C</sup>](#)

## Material Component<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/MaterialComponent>

**Sub Class Of** [resourceODP:Constituent<sup>C</sup>](#)

**In Range Of** [hasMaterialComponent<sup>op</sup>](#)

## Molecular Entity<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/MolecularEntity>

**Sub Class Of** [ChemicalEntity<sup>C</sup>](#)

## Neodymium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Neodymium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Nickel<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Nickel>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Niobium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Niobium>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Praseodymium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Praseodymium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Promethium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Promethium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Rare Earth Element<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/RareEarthElement>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

**Super Class Of**

- [Cerium<sup>C</sup>](#)
- [Dysprosium<sup>C</sup>](#)
- [Erbium<sup>C</sup>](#)
- [Europium<sup>C</sup>](#)
- [Gadolinium<sup>C</sup>](#)
- [Holmium<sup>C</sup>](#)
- [Lanthanum<sup>C</sup>](#)
- [Lutetium<sup>C</sup>](#)
- [Neodymium<sup>C</sup>](#)
- [Praseodymium<sup>C</sup>](#)
- [Promethium<sup>C</sup>](#)
- [Samarium<sup>C</sup>](#)
- [Scandium<sup>C</sup>](#)
- [Tantalum<sup>C</sup>](#)
- [Terbium<sup>C</sup>](#)
- [Thulium<sup>C</sup>](#)
- [Ytterbium<sup>C</sup>](#)
- [Yttrium<sup>C</sup>](#)

## Samarium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Samarium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Scandium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Scandium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Silicon<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Silicon>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Tantalum<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Tantalum>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Terbium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Terbium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Thulium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Thulium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Titanium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Titanium>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Ytterbium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Ytterbium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Yttrium<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Yttrium>

**Sub Class Of** [RareEarthElement<sup>C</sup>](#)

## Zinc<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/Zinc>

**Sub Class Of** [ChemicalElement<sup>C</sup>](#)

## Constituent<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/resource0DP/Constituent>

**Super Class Of** [MaterialComponent<sup>C</sup>](#)

## Matter<sup>C</sup>

**IRI** <http://w3id.org/CE0N/ontology/resource0DP/Matter>

**Super Class Of**  
[ChemicalEntity<sup>C</sup>](#)  
[Material<sup>C</sup>](#)

## Object Properties

### has chemical entity<sup>op</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/hasChemicalEntity>

**Domain** [Material<sup>C</sup>](#)

**Range** [ChemicalEntity<sup>C</sup>](#)

### has material component<sup>op</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/hasMaterialComponent>

**Domain** [Material<sup>C</sup>](#)

**Range** [MaterialComponent<sup>C</sup>](#)

## Datatype Properties

### anonymous formula<sup>dp</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/anonymousFormula>

### descriptive formula<sup>dp</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/descriptiveFormula>

### hill formula<sup>dp</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/hillFormula>

### reduced chemical formula<sup>dp</sup>

**IRI** <http://w3id.org/CE0N/ontology/material/reducedChemicalFormula>

## Namespaces

:



<http://w3id.org/CEON/ontology/material/>

**dcterms**

<http://purl.org/dc/terms/>

**odp**

<http://www.ontologydesignpatterns.org/schemas/cpannotationschema.owl#>

**owl**

<http://www.w3.org/2002/07/owl#>

**prov**

<http://www.w3.org/ns/prov#>

**rdf**

<http://www.w3.org/1999/02/22-rdf-syntax-ns#>

**rdfs**

<http://www.w3.org/2000/01/rdf-schema#>

**resourceODP**

<http://w3id.org/CEON/ontology/resourceODP/>

**vann**

<http://purl.org/vocab/vann/>

## Legend

c	Classes
op	Object Properties
dp	Datatype Properties