SpringerMaterials

助力您材料科学与工程的研究

巨蓉，施普林格·自然数据库产品经理

SPRINGER NATURE

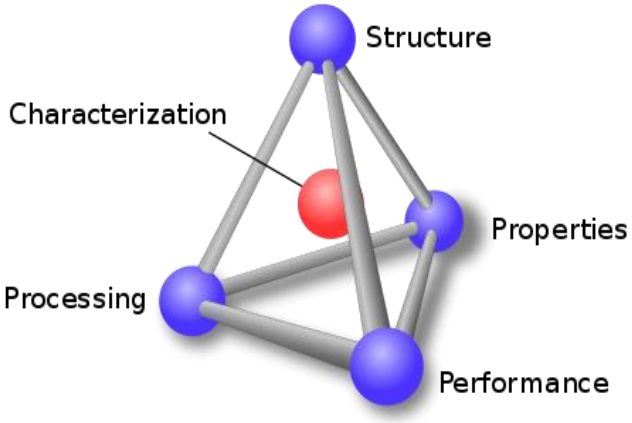
提纲:

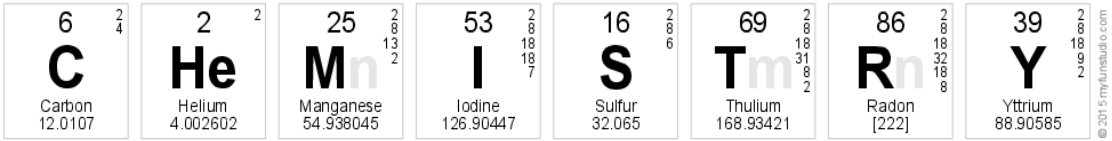
1. 背景介绍
2. SpringerMaterials简介
3. 使用方法
4. 问题解答

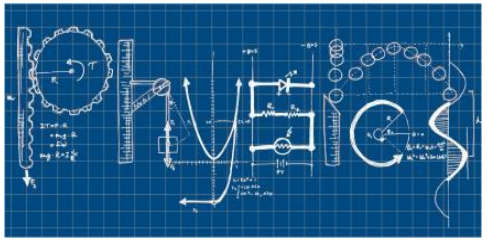
背景介绍

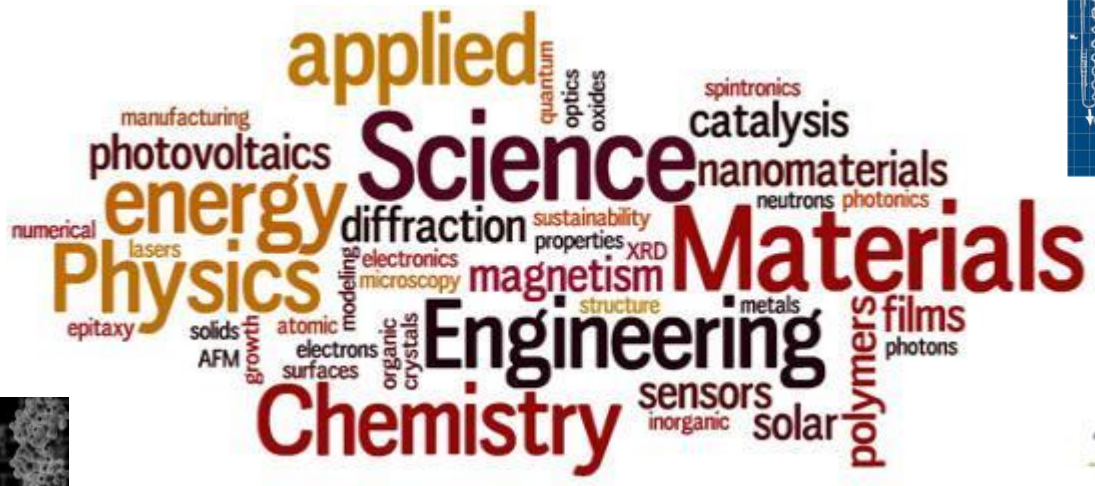
什么是材料科学?

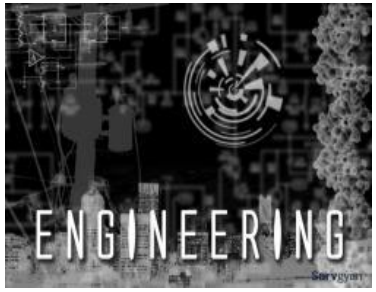
- Materials science is the "study of stuff"[1,2]
- Find & use relations between the structure and properties of materials
- Materials science is **multidisciplinary**:[3]











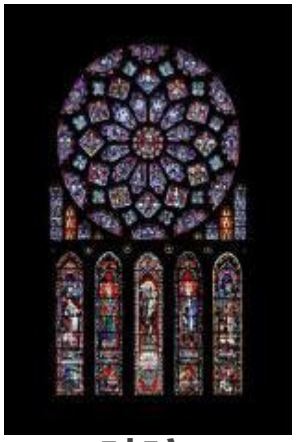
1) strangematterexhibit.com/whatis.html
2) en.wikipedia.org/wiki/Materials_science
3) rit.edu/cos/cmse/

材料种类

金属

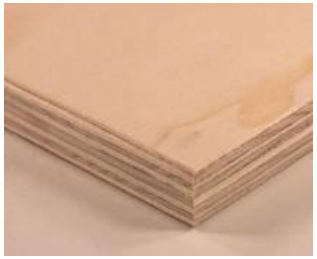
陶瓷

高聚物

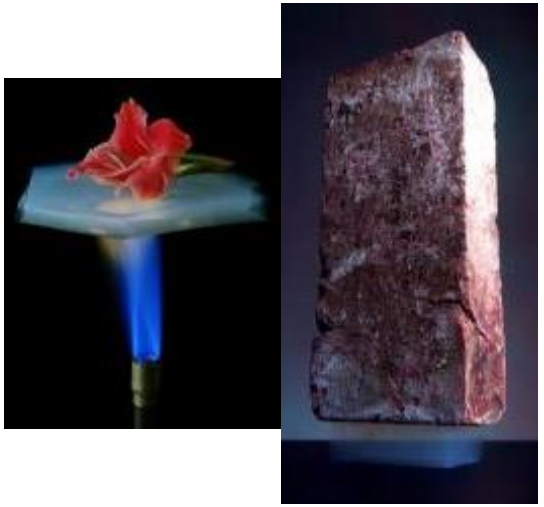


玻璃

电子材料



复合材料



外来材料

矿物

生物材料

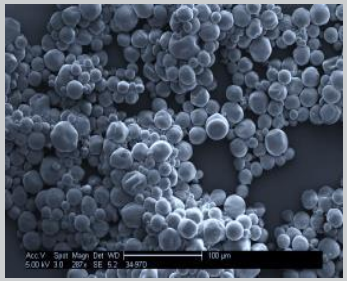
SPRINGER NATURE

材料科学涉及的领域

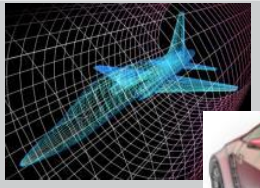
半导体和电子学

化工与制造

化学加工与分析



汽车航空工程



燃料与能源

玻璃与陶瓷

金属与冶金

高分子科学

SpringerMaterials简介

SpringerMaterials是什么?

SpringerMaterials：*经筛选整理的**材料性质**数据库*

主要材料类型与性质分类包括

- 金属与合金
- 陶瓷与玻璃
- 高分子聚合物
- 有机物
- 复合材料
- 原子与原子核


物理


化学


热力学


电磁学


结构


机械

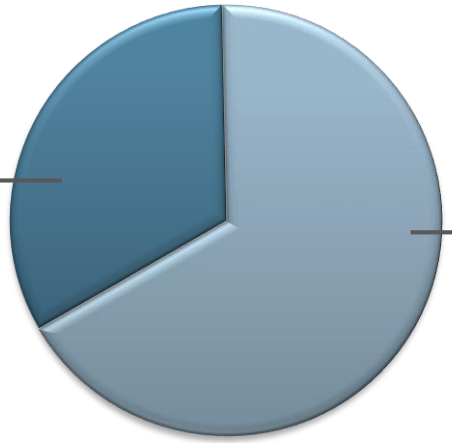

光谱学


原子能

SpringerMaterials由多个专业子数据库组成

SpringerMaterials

Landolt Börnstein



- Linus Pauling Files – Inorganic Solid Phases
- Thermophysical Properties (aka Dortmund Data Bank)
- Adsorption Database
- Polymer Thermodynamics Database (ATHAS)
- NIST Corrosion Database
- MSI Eureka
- Dortmund Databank of Separation Technology
- SpringerMaterials Interactive
- SpringerMaterials Fundamentals Handbooks
- Substance Profiles
- NMR data collection
- Springer Handbooks (e.g., VDI Heat Atlas)

数据库内容按季度持续更新

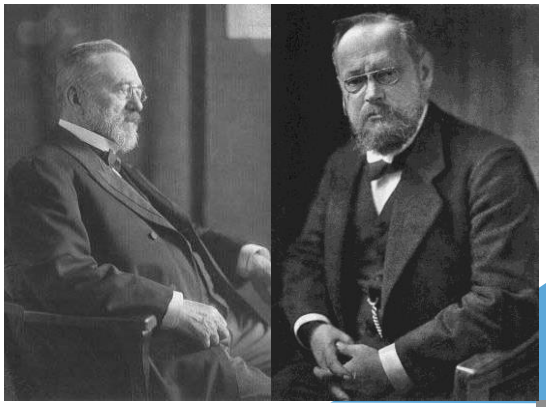
SpringerMaterials与Landolt-Börnstein: 历史

LANDOLT-
BÖRNSTEIN

实验结果综述，最佳实验做法，
等等

由超过1000名专家、学
者、编辑评审的数据

柏林
1883



Hans Landolt

Richard
Börnstein

The Landolt-Börnstein Series

Landolt-Börnstein：威名显赫的用户

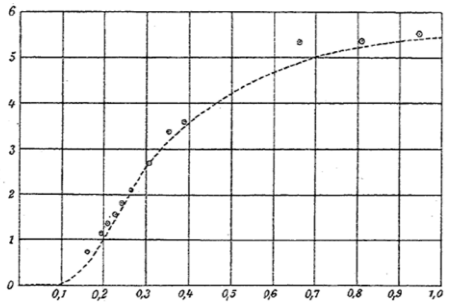
ANNALEN
DER
PHYSIK.

9. *Die Plancksche Theorie der Strahlung und die Theorie der spezifischen Wärme;* von *A. Einstein.*

In zwei früheren Arbeiten[1]) habe ich gezeigt, daß die Interpretation des Energieverteilungsgesetzes der schwarzen Strahlung im Sinne der Boltzmannschen Theorie des zweiten Hauptsatzes uns zu einer neuen Auffassung der Phänomene der Lichtemission und Lichtabsorption führt, die zwar noch keineswegs den Charakter einer vollständigen Theorie besitzt, die aber insofern bemerkenswert ist, als sie das Verständnis einer Reihe von Gesetzmäßigkeiten erleichtert. In der vorliegenden Arbeit soll nun dargetan werden, daß die Theorie der Strahlung — und zwar speziell die Plancksche Theorie — zu einer Modifikation der molekular-kinetischen Theorie der Wärme führt, durch welche einige Schwierigkeiten beseitigt werden, die bisher der Durchführung jener Theorie im Wege standen. Auch wird sich ein gewisser Zusammenhang zwischen dem thermischen und optischen Verhalten fester Körper ergeben.

Bern, November 1906.

(Eingegangen 9. November 1906.)



betreffenden festen Stoffe vorkommen, für die spezifische Wärme pro Grammäquivalent den Ausdruck[1])

$$(8a) \qquad c = 5{,}94 \sum \frac{e^{\frac{\beta\nu}{T}} \left(\frac{\beta\nu}{T}\right)^2}{\left(e^{\frac{\beta\nu}{T}} - 1\right)^2}.$$

Wir entnehmen ferner den Tabellen von Landolt und Börnstein einige Angaben über ultrarote Eigenschwingungen (metallische Reflexion, Reststrahlen) einiger durchsichtiger fester Körper; die beobachteten λ sind in nachstehender Tabelle unter „$\lambda_{beob.}$“ angegeben; die Zahlen unter „$\lambda_{ber.}$“ sind obiger Tabelle entnommen, soweit sie sich auf Atome von abnorm kleiner spezifischer Wärme beziehen; für die übrigen soll $\lambda > 48\,\mu$ sein.

Körper	$\lambda_{beob.}$	$\lambda_{ber.}$
CaFl	24; 31,6	33; > 48
NaCl	51,2	> 48
KCl	61,2	> 48
$CaCO_3$	6,7; 11,4; 29,4	12; 21; > 48
SiO_2	8,5; 9,0; 20,7	20; 21

关键材料科学主题涵盖

材料结构
- *相图*
- *晶体数据*

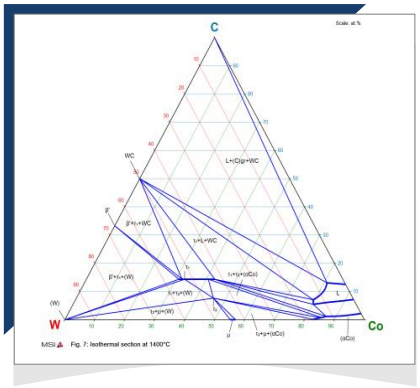
理化数据
- *电子、光学、磁学性质*
- *机械性质、反应等*

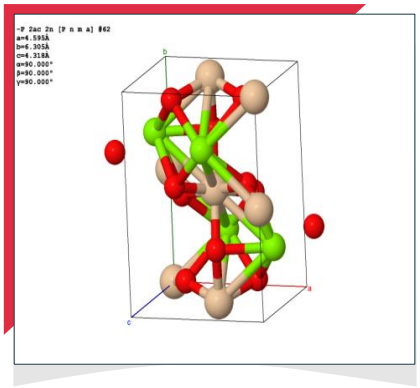
热力学
- *相平衡于转换*
- *混合物性质*

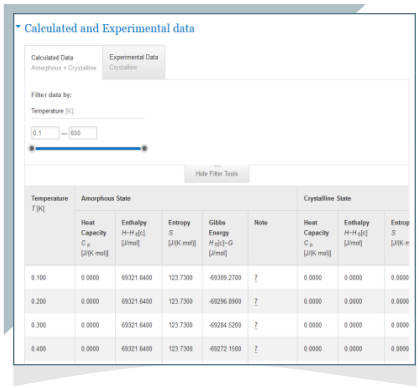
材料分析
- *光谱*
- *显微成像*
- *表征*

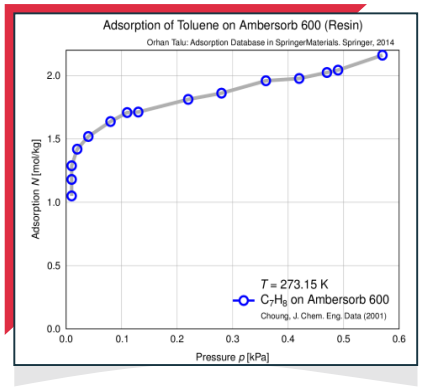
表面科学
- *气体扩散*
- *金属腐蚀*
- *扩散*

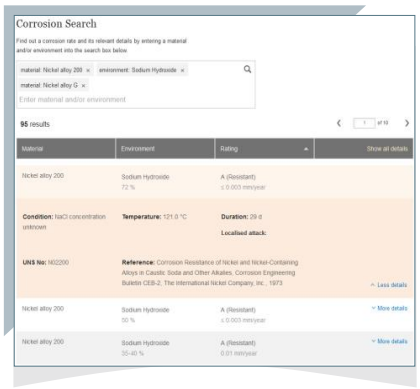
数据类型：相图、 晶体结构、数据表格、材料性质档案、曲线图等

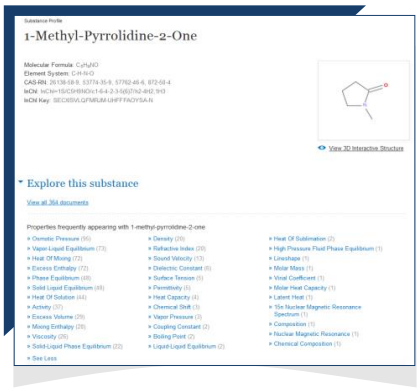


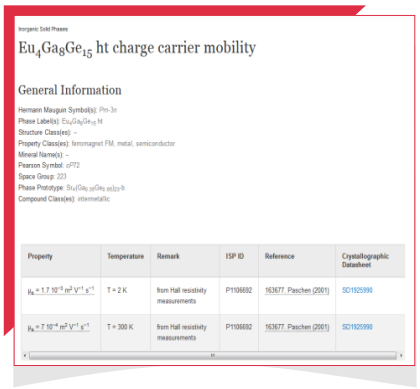


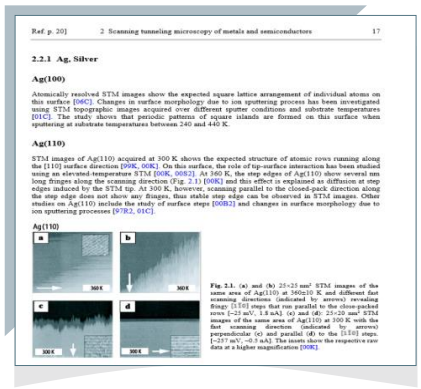












*数据库内容*按季度更新

核心功能及使用方法

SpringerMaterials功能概览

随时随地 *可从任何设备访问*
materials.springer.com

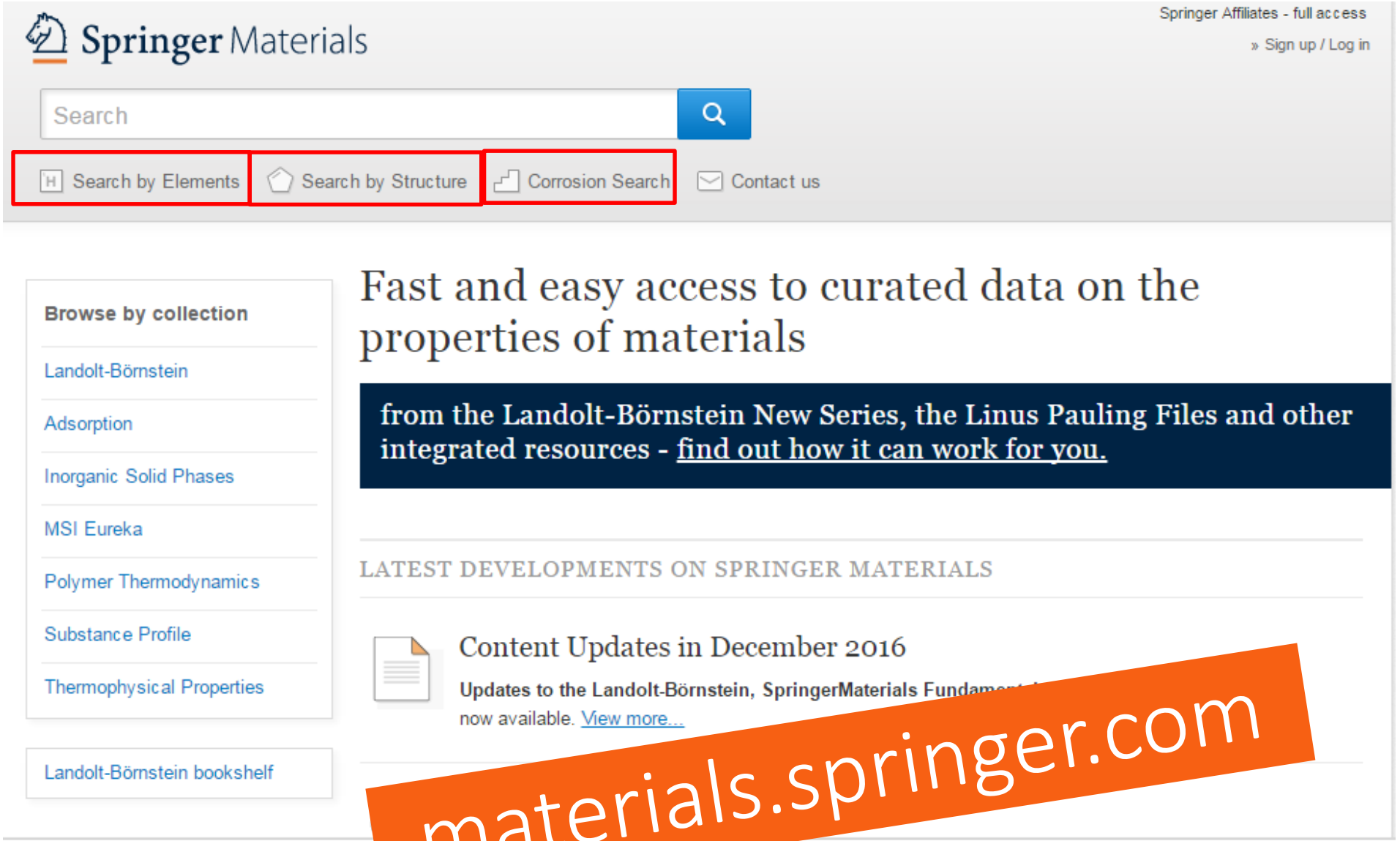
互动 *晶体结构、数据表格、相图、数据输出*

完全访问 *Springer Materials数据合集所有内容*

*按性质和学科领域***细化检索结果**

简单/复杂检索：*文本、元素周期表、化学结构*

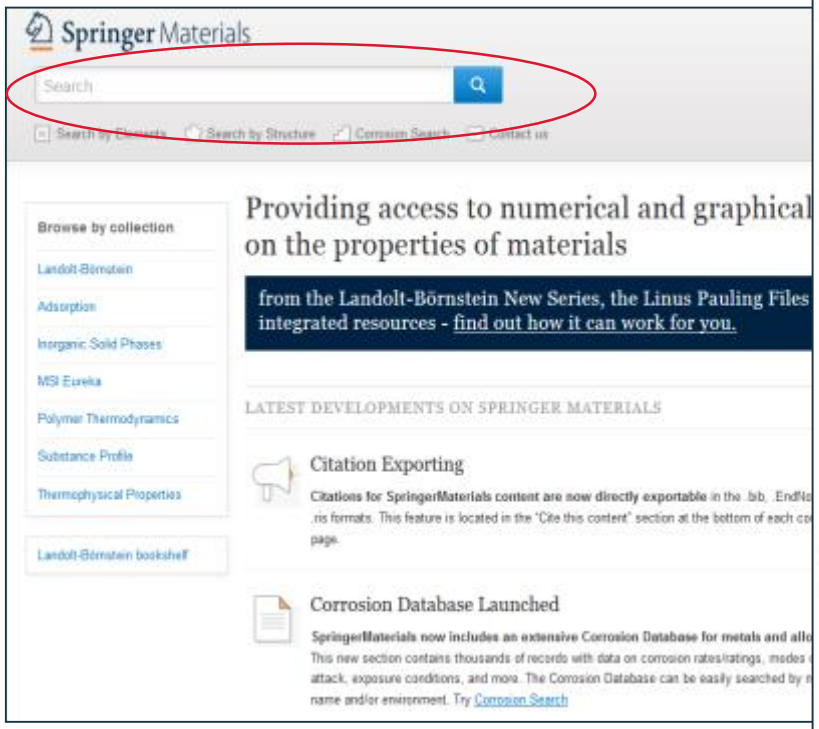
SpringerMaterials平台

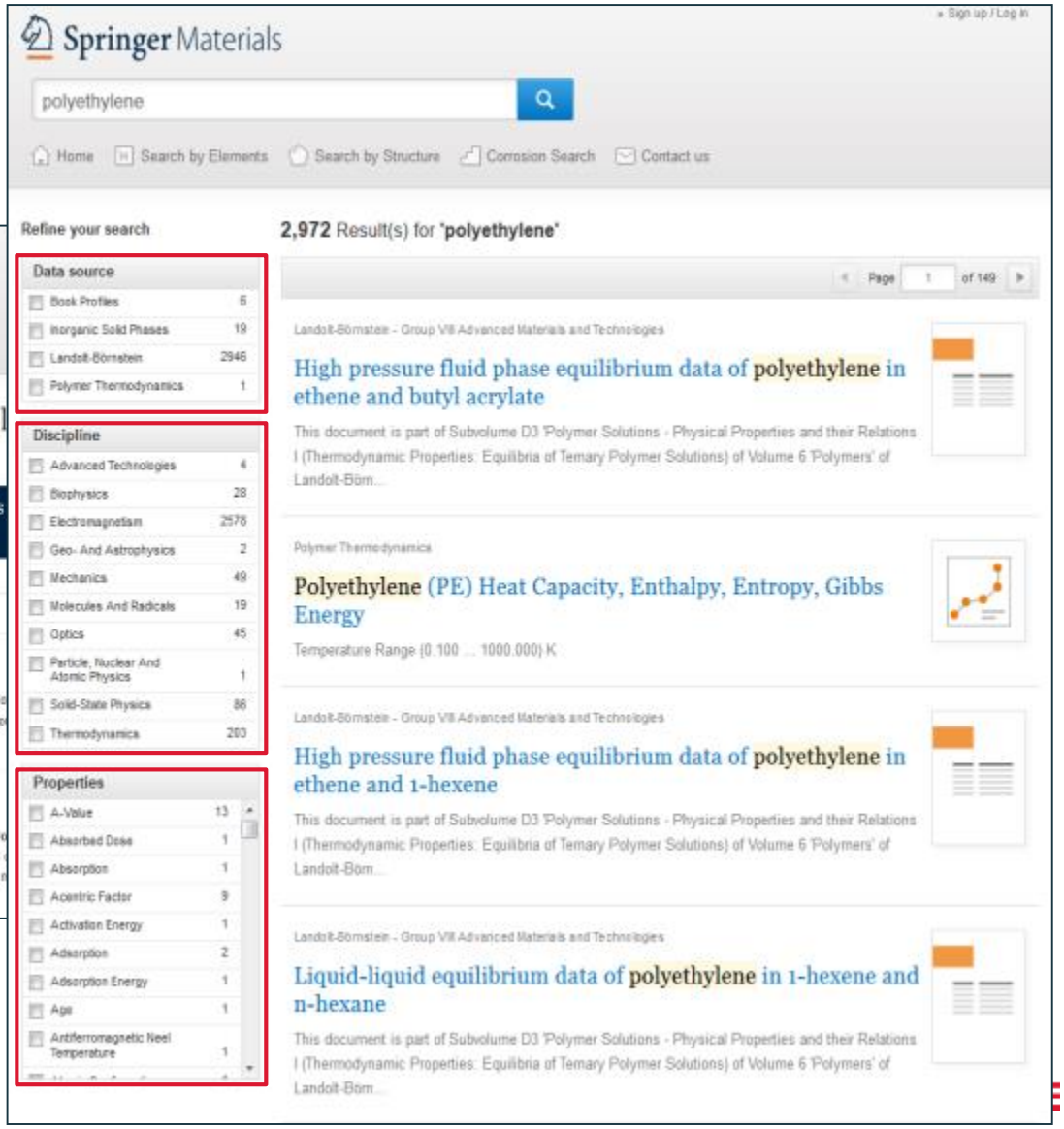


materials.springer.com

文本框检索和结果细化

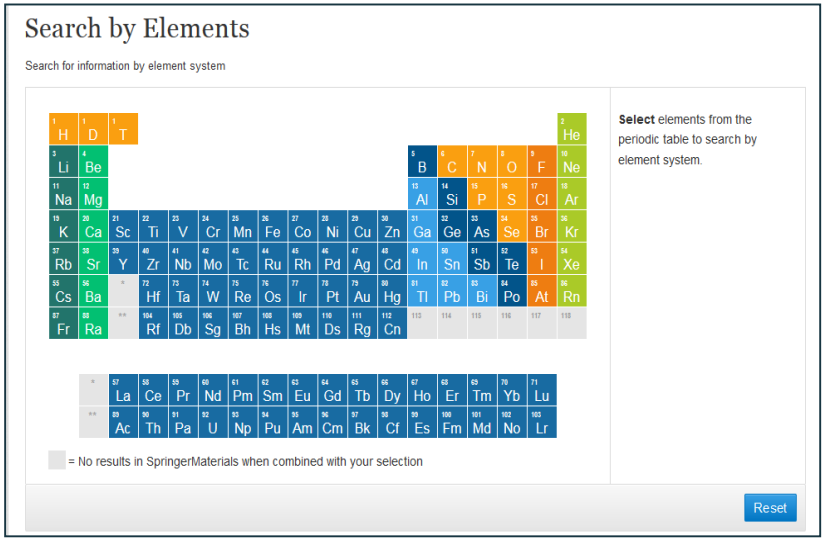
- 可以根据数据源、规程和/或单个材料属性对结果进行细化:

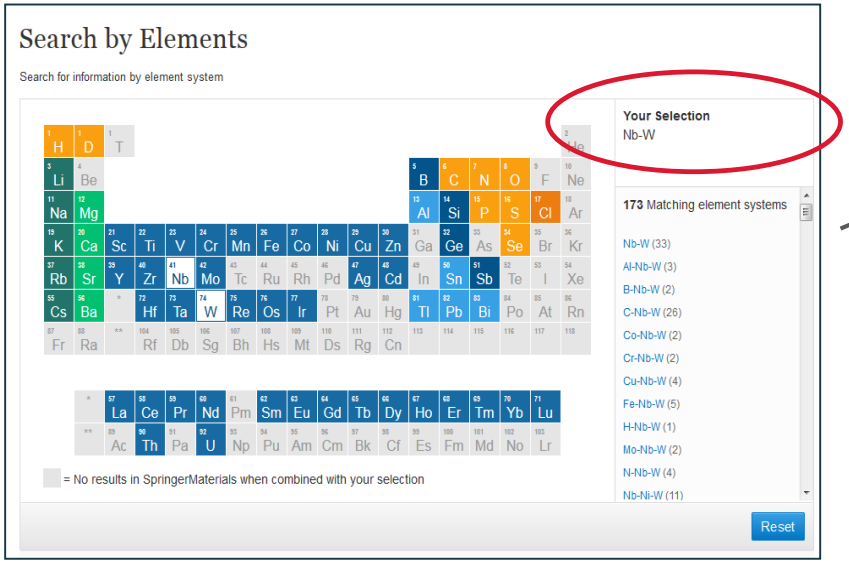


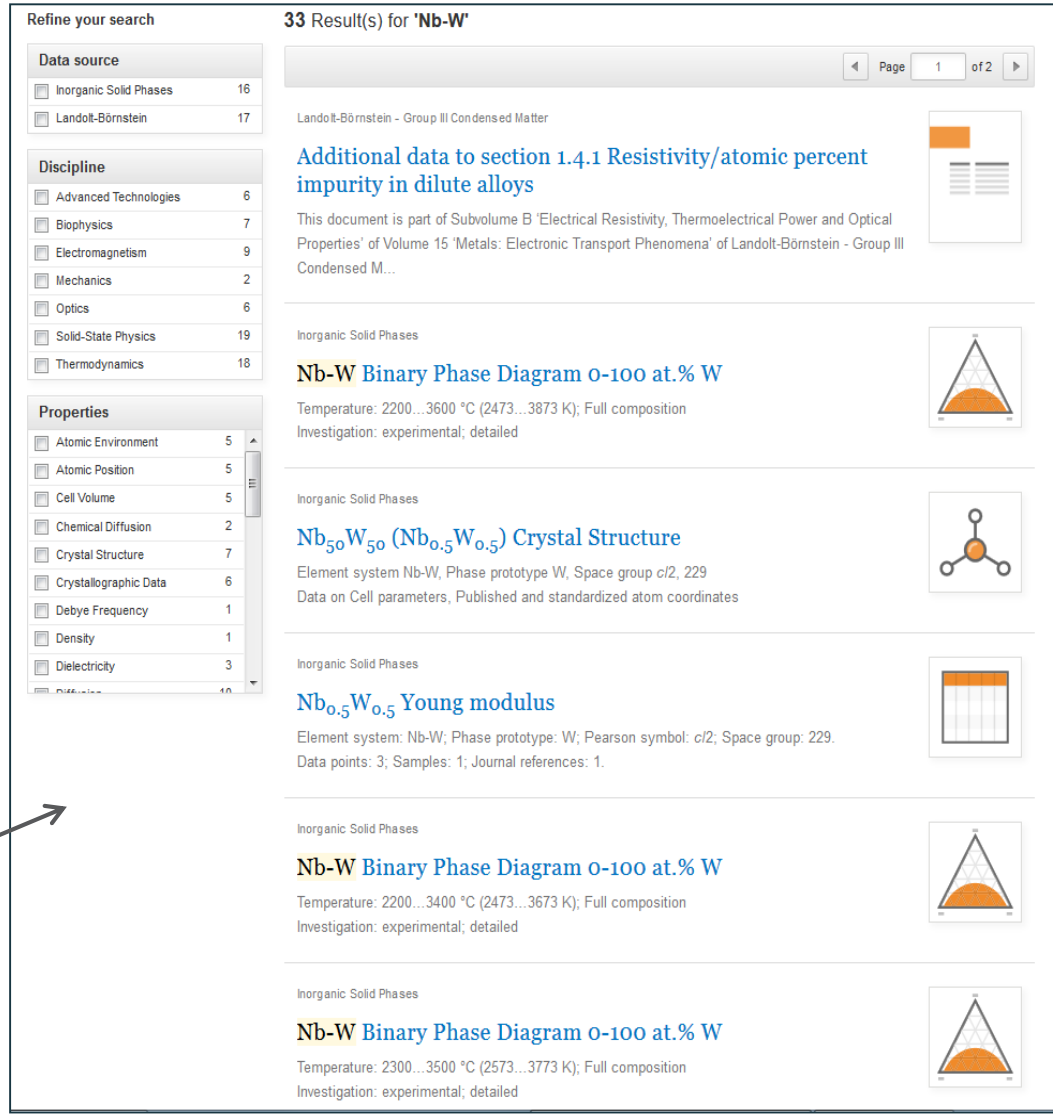


周期表检索

- Query: Nb-W

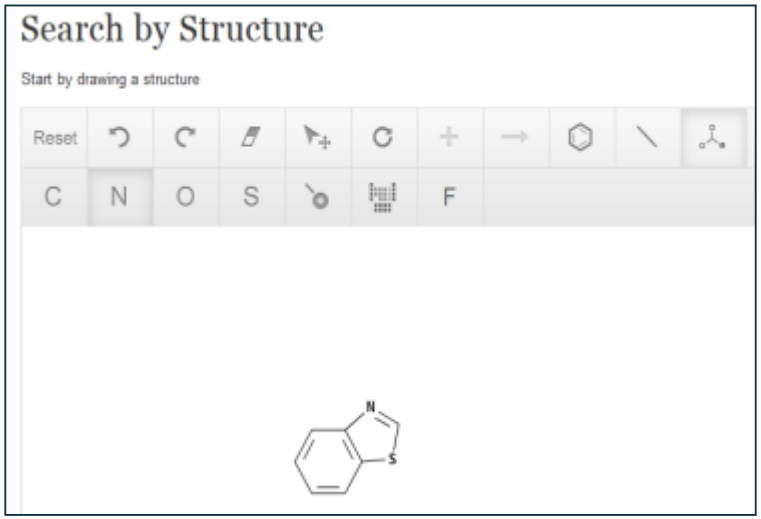


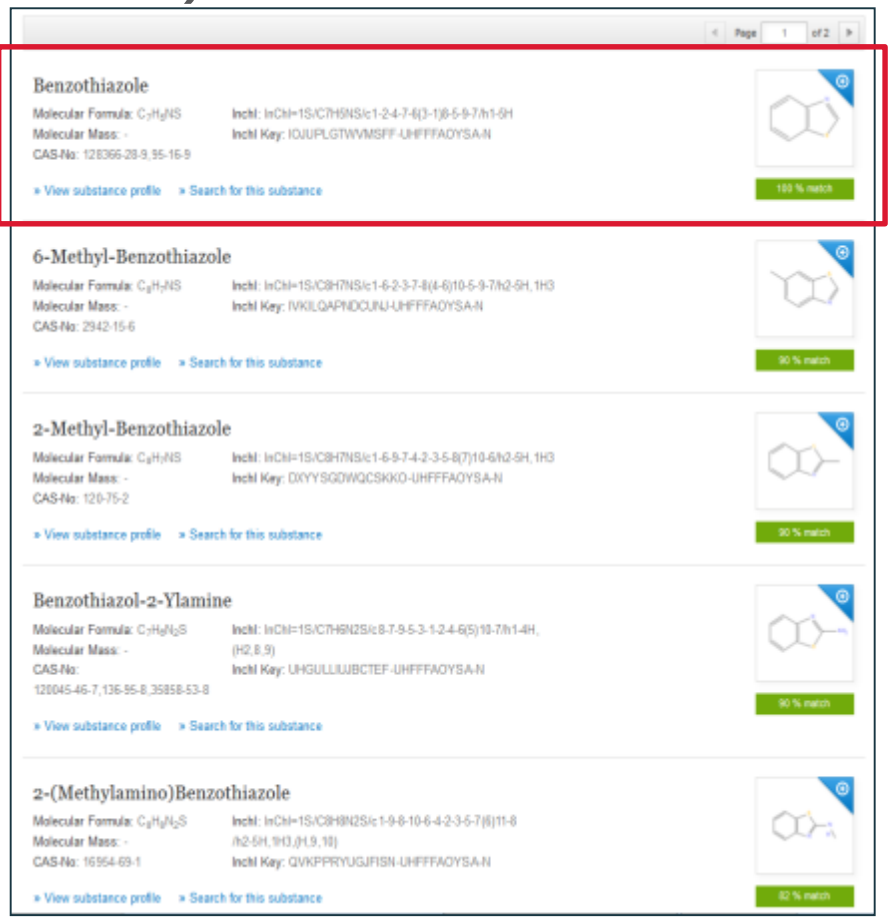


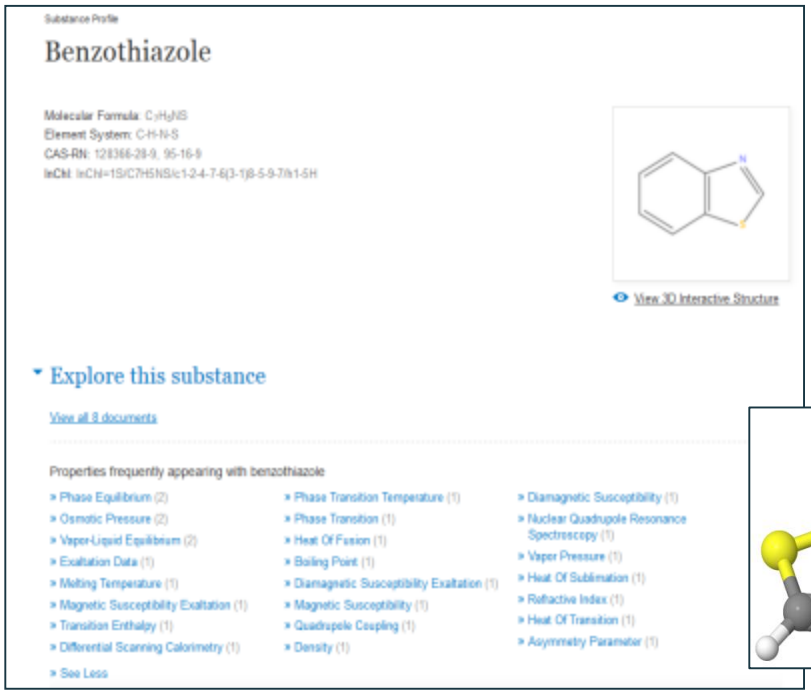


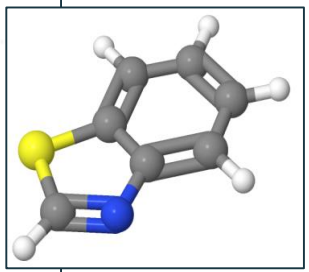
化学结构检索

- Query: **苯并噻唑 /苯硫氮醇**（benzothiazole）









腐蚀数据检索

- 按物料及环境搜寻及分类

Seawater-301 stainless steel / 2Ni steel

Corrosion Search

Find out a corrosion rate and its relevant details by entering a material and/or environment into the search box below.

environment: Seawater × material: 301 stainless steel × material: 2Ni steel ×

Enter material and/or environment

7 results

Material	Environment	Rating
301 stainless steel	Seawater	A (Resistant) ≤ 0.125 mm/year
2Ni steel	Seawater	A (Resistant) 0.084 mm/year
2Ni steel	Seawater	A (Resistant) 0.1 mm/year
2Ni steel	Seawater	B (Good) 0.19 mm/year
301 stainless steel	Seawater	C (Questionable) 0.5 - 1.25 mm/year
2Ni steel	Seawater	Localized
2Ni steel	Seawater	Localized

Download this table (CSV format, UTF-8 encoded)

铌在硫酸（Niobium in sulfuric acid）

Corrosion Search

Find out a corrosion rate and its relevant details by entering a material and/or environment into the search box below.

material: Niobium ×

Enter material and/or environment

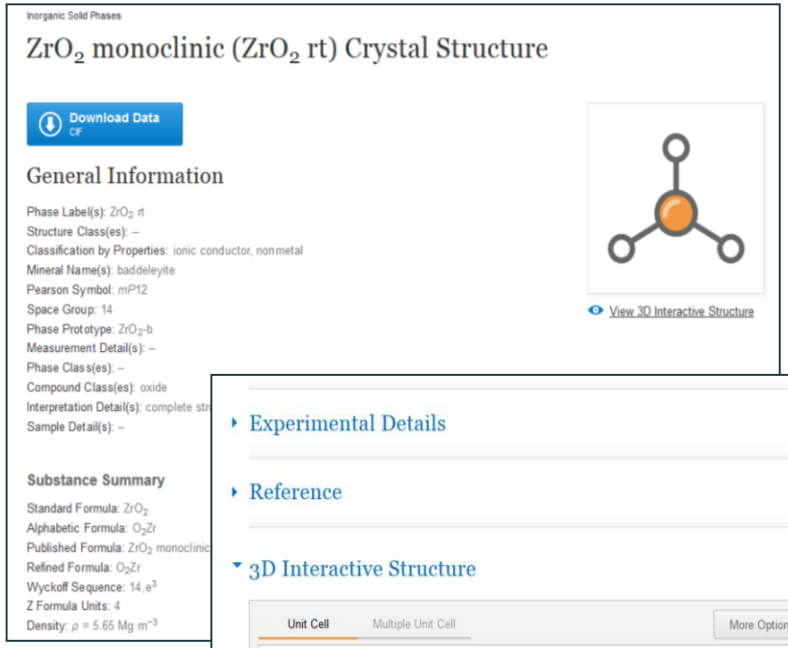
157 results

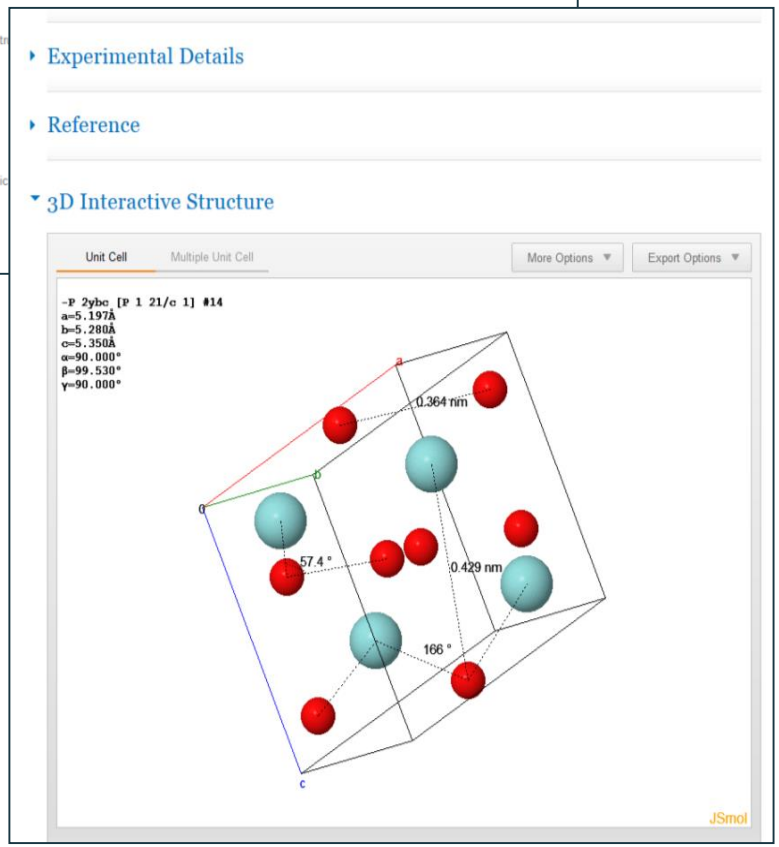
2 of 16

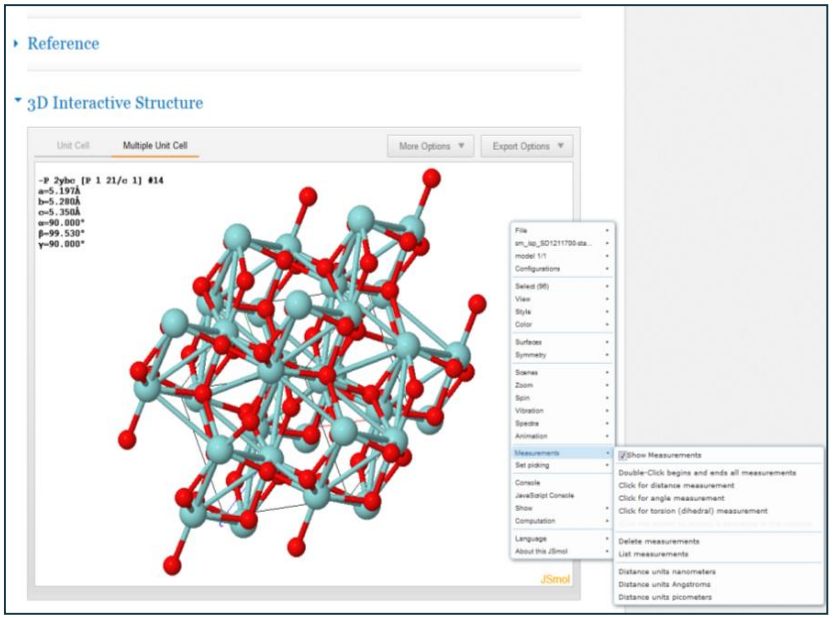
Material	Environment	Rating	Show all details
Niobium	Sulfuric Acid 98 %	A (Resistant) 5.0E-4 mm/year	
Condition:	**Temperature:** 19.0 °C - 26.0 °C	**Duration:** 36 d **Localised attack:**	
UNS No: R04210	**Reference:** Metals Handbook, Ninth Edition, Vol 13, Corrosion, ASM International, Metals Park, OH, 1987, p 730		Less details
Niobium	Sulfuric Acid 72 %	A (Resistant) 0.1 mm/year	More details
Niobium	Sulfuric Acid 72 %	A (Resistant) 0.03 mm/year	More details
Niobium	Sulfuric Acid 50 %	A (Resistant) ≤ 0.125 mm/year	More details
Niobium	Sulfuric Acid 50 %	A (Resistant) ≤ 0.125 mm/year	More details

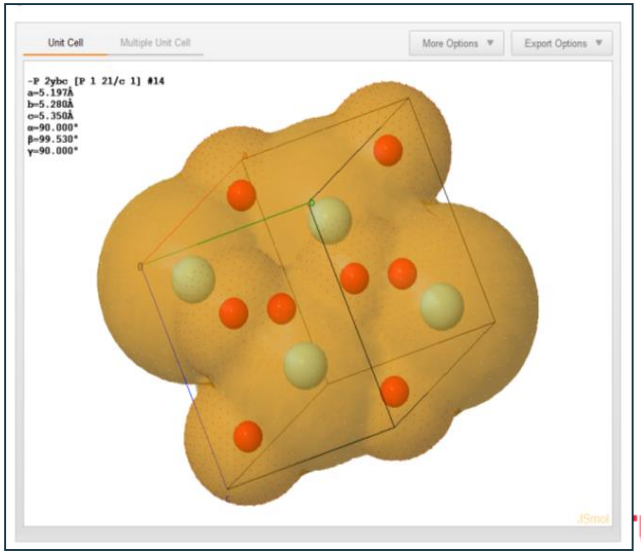
晶体结构及互动功能

Query: ZrO2 monoclinic Crystal structure



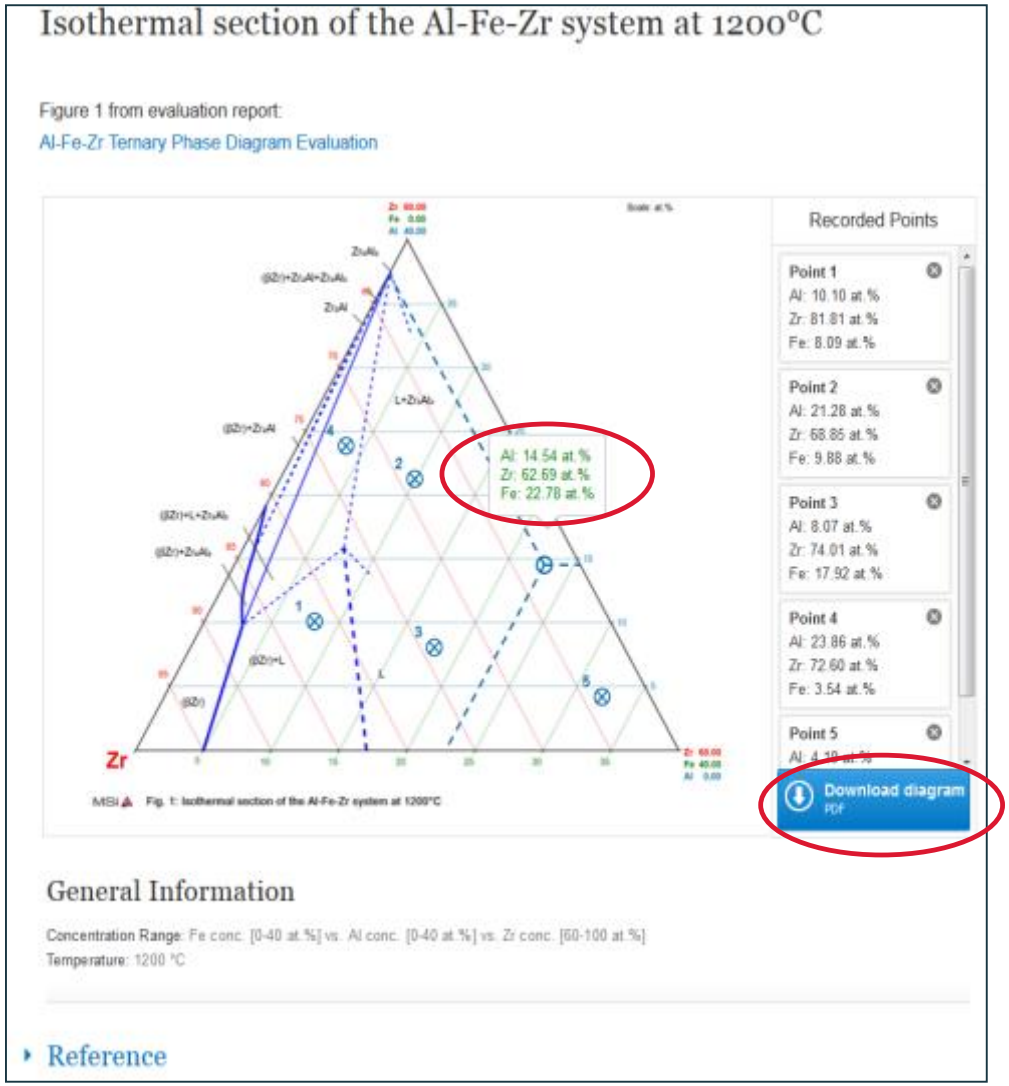




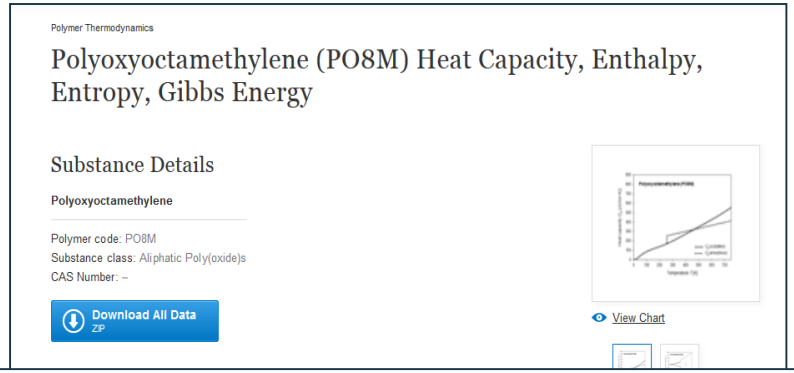


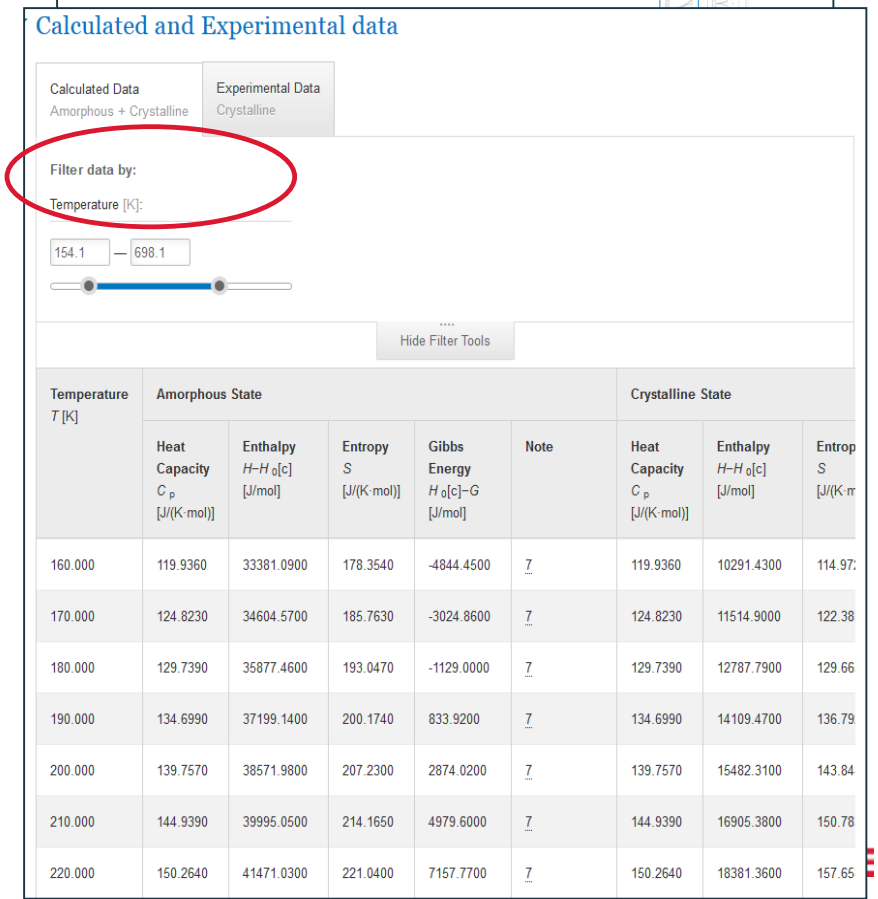
相图、数据及互动功能

- Interactive Phase Diagrams: (Al-Fe-Zr):



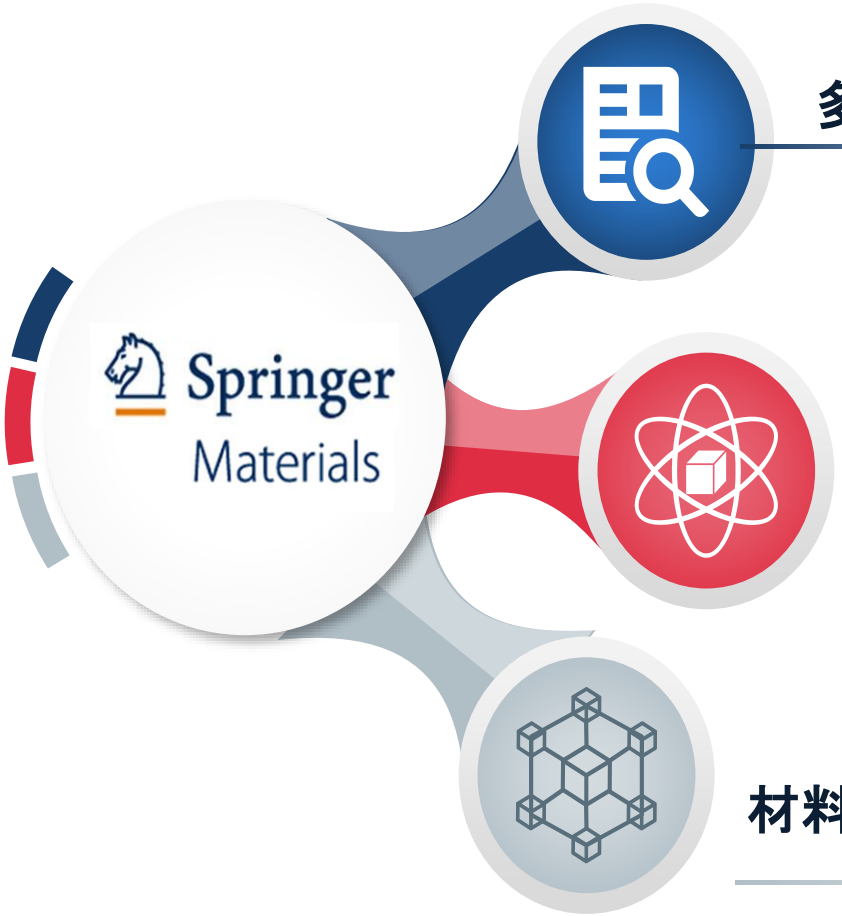
- Data Table Sliders:





Temperature T [K]	Amorphous State					Crystalline State		
	Heat Capacity C_p [J/(K·mol)]	Enthalpy $H–H_0[c]$ [J/mol]	Entropy S [J/(K·mol)]	Gibbs Energy $H_0[c]–G$ [J/mol]	Note	Heat Capacity C_p [J/(K·mol)]	Enthalpy $H–H_0[c]$ [J/mol]	Entrop S [J/(K·m
160.000	119.9360	33381.0900	178.3540	-4844.4500	7	119.9360	10291.4300	114.97
170.000	124.8230	34604.5700	185.7630	-3024.8600	7	124.8230	11514.9000	122.38
180.000	129.7390	35877.4600	193.0470	-1129.0000	7	129.7390	12787.7900	129.66
190.000	134.6990	37199.1400	200.1740	833.9200	7	134.6990	14109.4700	136.79
200.000	139.7570	38571.9800	207.2300	2874.0200	7	139.7570	15482.3100	143.84
210.000	144.9390	39995.0500	214.1650	4979.6000	7	144.9390	16905.3800	150.78
220.000	150.2640	41471.0300	221.0400	7157.7700	7	150.2640	18381.3600	157.65

SpringerMaterials: 打造现代数据库



多种来源科学内容筛选整理

数据数字化、充实并整合

材料科学独特功能

数据来源：经典 Landolt-Börnstein系列、MSI Eureka、Linus Pauling文档-无机固相、聚合物热力学数据库（ATHAS）、Dortmund分离技术数据库、施普林格系列手册（例如，VDI Heat Atlas）、吸附数据库、NIST腐蚀数据库、SpringerMaterials基础知识手册

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