

## **MSI Eureka. Modern Electronic Resource and Tool for Efficient Materials R&D**

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Efficient progress in materials requires understanding of the physical and chemical properties of a material which in turn requires to know the materials constitution, its driving forces, the materials thermodynamics, and its kinetics, if possible. This challenge of correlated subjects requires networking and integration of many skills.

36 years ago, this challenge was taken on, by a global team of material scientists (MSIT®, Materials Science International Team) starting from the Max-Planck-Institute of Metals Research (Stuttgart, Germany), under the lead of Dr. Günter Effenberg. Since then MSIT® continues to organize the never-ending flood of materials constitution data, to keep them accessible and interpretable, and to evaluate as many of the scattered data as possible.

The results of these activities are accessible from MSI Eureka® - the world's largest knowledge base on materials constitution of inorganic materials. It is made by scientist for scientists and engineers to keep its users current with the growing knowledge in materials chemistry. MSI Eureka® contains information on unary, binary and multicomponent systems up to 15 components. Today, its electronic content includes over 496,800 entries related to more than 76,150 material systems and almost 16000 diagrams and graphs. Its content is continuously updating and growing. The data base MSI Eureka® covers constitutional data on many materials classes, like alloys, non-metals and some composites.

The lecture gives an overview of different data categories in MSI Eureka® and demonstrates how it can be used in R&D of materials.

MSI Eureka is the world's leading interactive database for high-quality, evaluated phase diagrams and related constitutional data.

**Relevant for:**

- Engineering
- Materials Science
- Crystallography
- Thermodynamics
- Crystal growth
- Materials design
- Alloy development
- Chemistry
- Physics
- Industrial engineering across multiple industries
- others

**On alloys**

(steels, bronzes, magnets, implants, electronic materials,...)

**On non-metals**

(ceramics, semiconductors, sensors, ...)

**On composites**

(cermets, ...)

**MSI EUREKA** is

**a one-stop resource for materials chemistry:**

- ▶ phase diagram information; thermodynamics & kinetics
- ▶ crystal structure data; materials properties
- ▶ ideal resource of evaluated input data for Calphad modelling

**MSI EUREKA** includes

**MSIT Documents:  
(full-text factual database on materials constitution)**

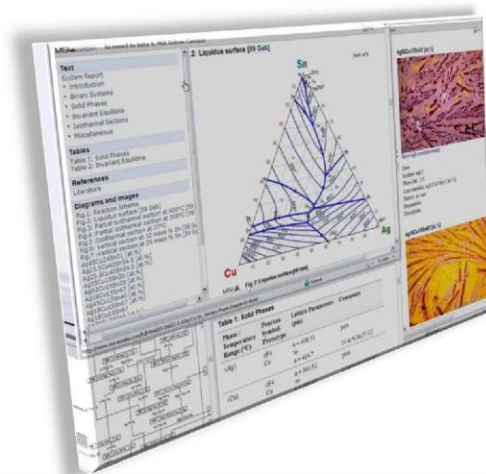
- ▶ **4,597** critical evaluations of binary & ternary systems
- ▶ **4,295** extended extracts from literature
- ▶ **15,828** phase diagrams and graphs
- ▶ and continuously updated

**MSI EUREKA** includes

**Materials World Library:  
(bibliographic database on materials constitution)**

- ▶ all materials systems are cross-linked with relevant publications, allows delivery of relevant search results only
- ▶ benefit from the Materials Ontology approach and find similar materials with one click
- ▶ **496,868** bibliographic entries on all inorganic materials ever published, related to
- ▶ **76,150** material systems
- ▶ and continuously updated

**About us**



The Authoring Team that creates MSI Eureka

MSIT®, a global network of experts, cooperates for over 36 years, structured regionally, operating globally (MSIT Russia, MSIT China, MSIT Europe, others). More than 280 scientists compile and evaluate data, generate missing data, create phase diagrams and describe the materials constitution, in MSI Eureka. They

- monitor all relevant publications
- evaluate data on binary & ternary material systems
- published more than 60 books, edited by MSI



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**MSI EUREKA**

materials knowledge  
comprehensive  
relevant

**MSI EUREKA**  
**NEW SEARCH**

## NEW SEARCH FUNCTIONS

Find material properties  
by combining search criteria: material systems + keywords

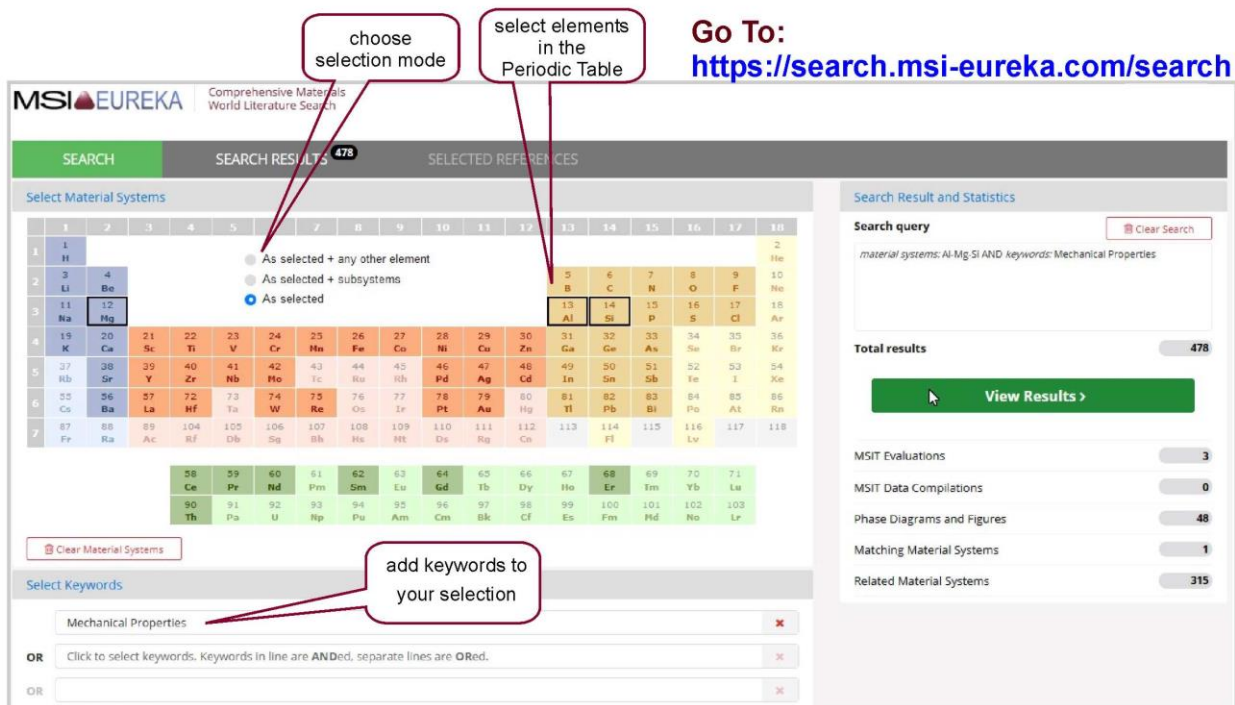
MSI Eureka is a one-stop platform that offers everything related to materials constitution: from exhaustive bibliography to high-quality evaluated phase diagrams.

Materials constitution describes phase relations, crystal structures, thermodynamics ... and more in a material system.

The NEW search interface brings together journal articles with material systems and many other sources of information, including conference proceedings, books, theses, case studies, reference handbooks and databases.

The NEW search interface is integral part of MSI Eureka and free of charge for existing customers.

**Go To:**  
<https://search.msi-eureka.com/search>



The screenshot shows the MSI Eureka search interface. At the top, there's a search bar and a 'SEARCH' button. Below it, the 'SELECTED REFERENCES' section shows 478 results. The main area is a periodic table where elements Al, Mg, and Si are selected. A callout 'choose selection mode' points to the search options: 'As selected + any other element', 'As selected + subsystems', and 'As selected'. Another callout 'select elements in the Periodic Table' points to the selected elements. A third callout 'add keywords to your selection' points to the keyword input field where 'Mechanical Properties' is entered. On the right, the 'Search Result and Statistics' section shows the search query: 'material systems: Al-Mg-Si AND keywords: Mechanical Properties'. Below this, there's a 'View Results >' button and a list of search results with counts: MSIT Evaluations (3), MSIT Data Compilations (0), Phase Diagrams and Figures (48), Matching Material Systems (1), and Related Material Systems (315).

## Advantages of Literature Search in MSI Eureka

### MSI Eureka

- ▶ intuitive search interface
- ▶ finds **only relevant** information
- ▶ publications since 1830 completely covered
- ▶ finds materials related to your search (**data ontology**)

search  
relevance  
completeness  
value added info

### Other sources

- ▶ long complicated search phrases
- ▶ many irrelevant hits need manual sorting out
- ▶ publications before 1960 poorly covered
- ▶ no cross-analytics for similar materials

## NEW SEARCH FUNCTIONS

Find material properties  
by combining search criteria: material systems + keywords

**76,150** systems with **496,868\*** bibliographic citations link material systems and all their publications, for each individual system!

The bibliographic data base covers practically all relevant publications from 1830 up to the present, providing a valuable and constantly growing information source.

\* as of Dec. 2021, continuously updated

refine results by  
- type of publication  
- year  
- system

get list of similar materials

limit number of components

sort results by  
- year  
- author  
- source

open full-text MSIT documents

read full abstract

work with selected references

print or export search results

**MSI EUREKA**

materials knowledge  
comprehensive  
relevant

## Features

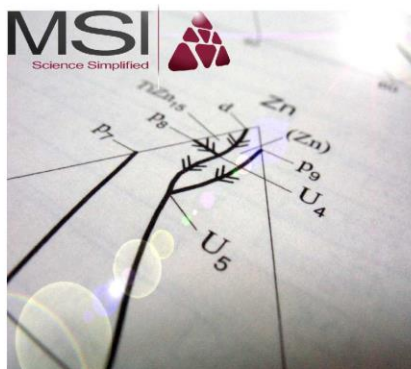
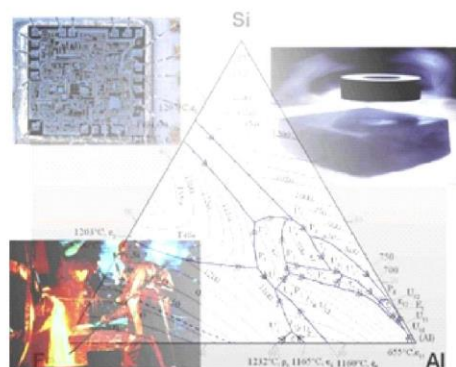
- The only source offering information for ALL inorganic material systems ever studied, over 76,150 element combinations
- Largest number of critically evaluated material systems, more than 4,597 evaluated systems
- The largest bibliographic database on materials constitution, over 496,868 entries, from 1830 - present
- Monitors unary, binary, ternary and ...multi-component materials systems
- Comprehensive and continuously updated
- Fully searchable, interactive, intuitive and user friendly

## MSI Eureka is unique by

- **Coverage**  
inorganic materials, all ever published  
> 76,150 material systems, as of December 2021
- **Extensive search possibilities**  
highly effective search engine
- **Unparalleled in depth and breadth at highest quality**  
unlike others, our evaluation reports are critically evaluated, and independently reviewed by experts
- **Affordability**  
flexible license scheme allowing annual subscriptions or perpetual use of data
- **Possibility to join MSIT**  
customers of MSI Eureka have first priority on registration to MSIT Schools on Materials Chemistry.

## Benefits

- ▶ Find & navigate the world's collective knowledge with a few mouse clicks
  - fast and comprehensive!
  - by materials
  - by properties
  - by categories of added value
  - from 1830 till now
- ▶ Bring real-life examples into classroom teaching
- ▶ Save time and money
  - with expert evaluations in hand, identify key areas for experiments or computations.
  - saving energy, resources and time, leads to efficient research strategies.
- ▶ Supplement and accelerate genomic approach for materials design and Integrated Computational Materials Engineering



## Contact us

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Read more about MSI Eureka: [www.msiport.com](http://www.msiport.com)  
Preview documents in MSI Eureka: [www.msi-eureka.com/search](http://www.msi-eureka.com/search)  
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