

[Back](#)

Research in the Commonwealth of Independent States on Superconducting Materials: Current State and Prospects

[Materials](#) • [Review](#) • [Open Access](#) • 2025 • DOI: 10.3390/ma18184299

[Tolendiuly, Sanat](#)^a ; [Akishev, Adil](#)^a ; [Fomenko, Sergey](#)^a ; [Nur-Akasyah, Jaafar](#)^b ; [Ilhamsyah, Abu Bakar Putra](#)^c ; [+1 author](#)

^aInstitute of Combustion Problems, Almaty, 480012, Kazakhstan

[Show all information](#)

2 61th percentile

Citations

0.08

FWCI

[View PDF](#)

[Full text](#)

[Export](#)

[Save to list](#)

[Document](#)

[Impact](#)

[Cited by \(2\)](#)

[References \(115\)](#)

[Similar documents](#)

Abstract

An overview of research on superconducting materials has been provided, including brief annotations of published papers and scientific cooperation among the Commonwealth of Independent States (CIS) countries: Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. It is shown that fundamental research on superconducting materials is being funded for development and study more at the government level in each republic than from private funds or organizations. One of the most promising materials, as indicated by recent studies, are those synthesized from metal hydrides, particularly lanthanum hydride, which exhibits superconducting properties at 203–253 K, close to room temperature. Unfortunately, this type of material's practical application is currently limited because of the extremely high pressure necessary during exploitation. The most promising direction, as inferred from research conducted in CIS countries, is the development of cuprate superconductors doped with rare-earth elements such as yttrium, lanthanum, and other metals. There are also iron–nitrogen junctions, metallic and organic

superconductors, and research into improving technologies for producing ultrathin substrates using laser or plasma deposition methods. CIS countries have established a strong scientific foundation in superconductivity, with Russia leading fundamental and experimental advances in high- and low-temperature superconducting materials. Future research will likely focus on improving synthesis techniques for ultrathin superconducting films and exploring novel doped hydride systems to achieve stable superconductivity near ambient temperatures. © 2025 by the authors.

Author keywords

Commonwealth of Independent States; HTS; LTS; manufacturing; superconducting properties

Indexed keywords

Engineering controlled terms

Critical current density (superconductivity); High pressure engineering; Hydrides; Iron research; Iron-based Superconductors; Lanthanum compounds; Organic superconducting materials; Superconducting films; Ultrathin films

Engineering uncontrolled terms

'current; Armenia; Azerbaijan; Belarus; Commonwealth of independent state; HTS; Kazakhstan; LTS; Scientific cooperation; Superconducting properties

Engineering main heading

Temperature

Reaxys Chemistry database information

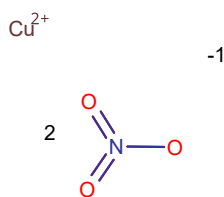
Reaxys is designed to support chemistry researchers at every stage with the ability to investigate chemistry related research topics in peer-reviewed literature, patents and substance databases. Reaxys retrieves substances, substance properties, reaction and synthesis data.

Substances

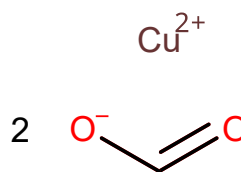
[View all substances \(3\)](#)

BiSr

[View details](#)



[View details](#)



[View details](#)

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
Ministry of Education and Science of the Republic of Kazakhstan See opportunities 	AP26195337	
Ministry of Education and Science of the Republic of Kazakhstan See opportunities 		

Funding text

This research was funded by the Science Committee of The Ministry of Science and Higher Education of the Republic of Kazakhstan (Grant No. AP26195337).

Corresponding authors

Corresponding author	N. Rakhym
Affiliation	Institute of Combustion Problems, Almaty, 480012, Kazakhstan
Email address	rakhymnursultan17@gmail.com

© Copyright 2025 Elsevier B.V., All rights reserved.

Abstract

Author keywords

Indexed keywords

Reaxys Chemistry database information

Funding details

Corresponding authors

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗

All content on this site: Copyright © 2026 [Elsevier B.V.](#) ↗, its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

