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

By

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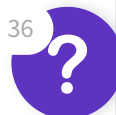
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Abstract

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.

Keywords

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No new data were created or analyzed in this study. Data sharing is not applicable to this article.

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