

# Iron-Based Superconducting Films: Status, Prospects and Challenges

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Fe-based superconductors (IBS), discovered 2006/2008, are the second class of high-temperature superconductors (HTS) besides the well-known cuprates. They share similarities with classical low-temperature superconductors (metallic behavior, relatively low anisotropies) with MgB<sub>2</sub> (multiband superconductivity) and the cuprate HTS (high critical magnetic fields, occasionally high critical temperatures, layered crystal structures, unconventional superconductivity).

From early days of research in IBS, these materials have been attempted to produce in the form of thin films besides polycrystalline bulk or single crystal investigations. So far, 5 different crystal structures have been successfully deposited as thin films, namely the so-called 11, 111, 122, 1111, and 5-1 systems named after their stoichiometries; and huge improvements have been achieved in their properties regarding microstructure and transport as well as in their basic understanding.

This talk will give an overview about the field of Fe-based superconducting thin films and cover aspects such as motivations for thin films in general and IBS, deposition techniques, and key experiments such as epitaxial strain, bicrystal grain boundaries, multilayers, pinning improvement, and films on technical substrates (coated conductors). It will conclude with current challenges and future perspectives.