

Structural and physical properties of iron chalcogenide thin films

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The arsenic-free iron chalcogenide possesses the simplest structure in the families of iron-based superconductors though its transition temperature is relatively not too high under the ambient pressure, while the very recently discovered K/Tl intercalating iron chalcogenide possesses the ordered Fe-vacancies and relatively high transition temperature.

We deposited single-phased, epitaxial, superconducting FeSe, Fe(Se,Te), and FeTe thin films, studied their structural and physical properties, found that the non-superconducting parent compound FeTe goes to superconduct in the form of thin films, and further found that the superconducting FeTe films possesses the so-called second long-range order of several hundreds nanometers long.

We also deposited successfully the single-phased, epitaxial KFe_xSe_2 thin films. Structural and physical properties of such newly obtained KFe_xSe_2 thin films are under investigation and will also be reported.