

High Field Vortex Phase Diagram of Fe(Se,Te) Thin Films

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Abstract - We report on the (H,T) vortex phase diagram up to 35 T of Fe(Se,Te) thin films deposited on CaF₂ substrates as determined by resistivity, Nernst effect and critical current measurements. We found the presence of a large region where the vortex are firmly pinned allowing the adoption of chalcogenides for low temperature but extremely high magnetic field applications. The fact that high critical current density values - larger than 1 MA/cm² in self field and liquid helium – are reached together with a very weak dependence on the magnetic field and a complete isotropy, joined with the very high rigidity of the vortex lattice at very high field make the Fe(Se,Te) phase very promising for low temperature (≤ 4.2 K) and high field (≤ 25 T) applications.

Keywords - Fe SeTe thin films, iron-based superconductors, vortex phase diagram, critical currents

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