



Contribution ID: 810

Type: **Contributed Oral Presentation**

M3Or3B-06: Fe(Se,Te) coated conductors deposited on simple metallic templates

Wednesday 24 July 2019 15:15 (15 minutes)

In this paper the feasibility of producing Fe(Se,Te) Coated Conductors on simple metallic templates is studied. Two routes were tested: i) Rolling-Assisted Biaxially Textured Substrate (RABiTS) and ii) unbuffered Invar 36 substrates. For route i), we started from commercially available Ni-5 at.% W tapes which show an out-of-plane orientation of about 6° and an in-plane orientation of 5.3° ; a RABiTS template for Fe(Se,Te) coated conductors was realized through CeO₂ thin film deposition via Pulsed Laser Ablation. The buffer layer exhibits an out-of-plane and an in-plane orientation suitable for Fe(Se,Te) deposition and acts as a chemical barrier against Ni diffusion. Fe(Se,Te) thin films deposited on such a simple template show a superconducting transition at 16 K and very high upper critical field values. The transport critical current reaches values of 1.7×10^5 A/cm² at 4.2 K in self field and is reduced by less than one order of magnitude up to 18 T, remaining isotropic with respect to the magnetic field direction. For route ii), we developed a suitable substrate with a sharp $\{001\} <100>$ texture and a misorientation angle lower than 10° . Here the possibility of growing epitaxial thin films without any buffer layer was demonstrated. It was also shown that the presence of a Fe(Se,Te) seed layer can improve the in- and out-of-plane orientation of the film. In this case, the absence of a superconducting transition has been attributed to Ni poisoning of the Fe(Se,Te) phase.s deposited on simple metallic templates

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Session Classification: M3Or3B - MgB₂ and Fe-based Wires