

# Development of Iron-based Wires and Tapes with Improved Properties for Magnet Applications

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**Abstract** – Magnet applications require conductors with high in-field performance, multifilamentary geometry, high mechanical stability, as well as long-length production. IEE-CAS continues to address iron-based wire development and fabricating methods to improve characteristics and performance of the wires and tapes. High performance at fields up to 33 T was recently reported with our record samples. To improve the in-field  $J_c$  we are now testing the applicability of artificial pinning to our PIT technology. By employing high strength Cu/Ag and Stainless steel/Ag as sheath materials a very significant improvement in terms of current density can be realized. Furthermore, transport  $J_c$  of 100 m long tapes was further enhanced, larger than 30000 A/cm<sup>2</sup> (4.2 K, 10 T). On the other hand, extensive practical studies on wire properties have also been carried out such as thermal conductivity, ac loss, bending diameter, mechanical properties, and uniformity of critical current and performance in magnetic fields. We will show a summary of the recently achieved properties and give an outlook on the next development steps on our program roadmap.

**Keywords (Index Terms)** – Superconducting wires, iron-based superconductors, critical current density, iron pnictide, powder-in-tube.

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