

ELECTROMAGNETIC PROPERTIES OF REBCO COATED CONDUCTOR WITH MULTI-SUPERCONDUCTING LAYERS

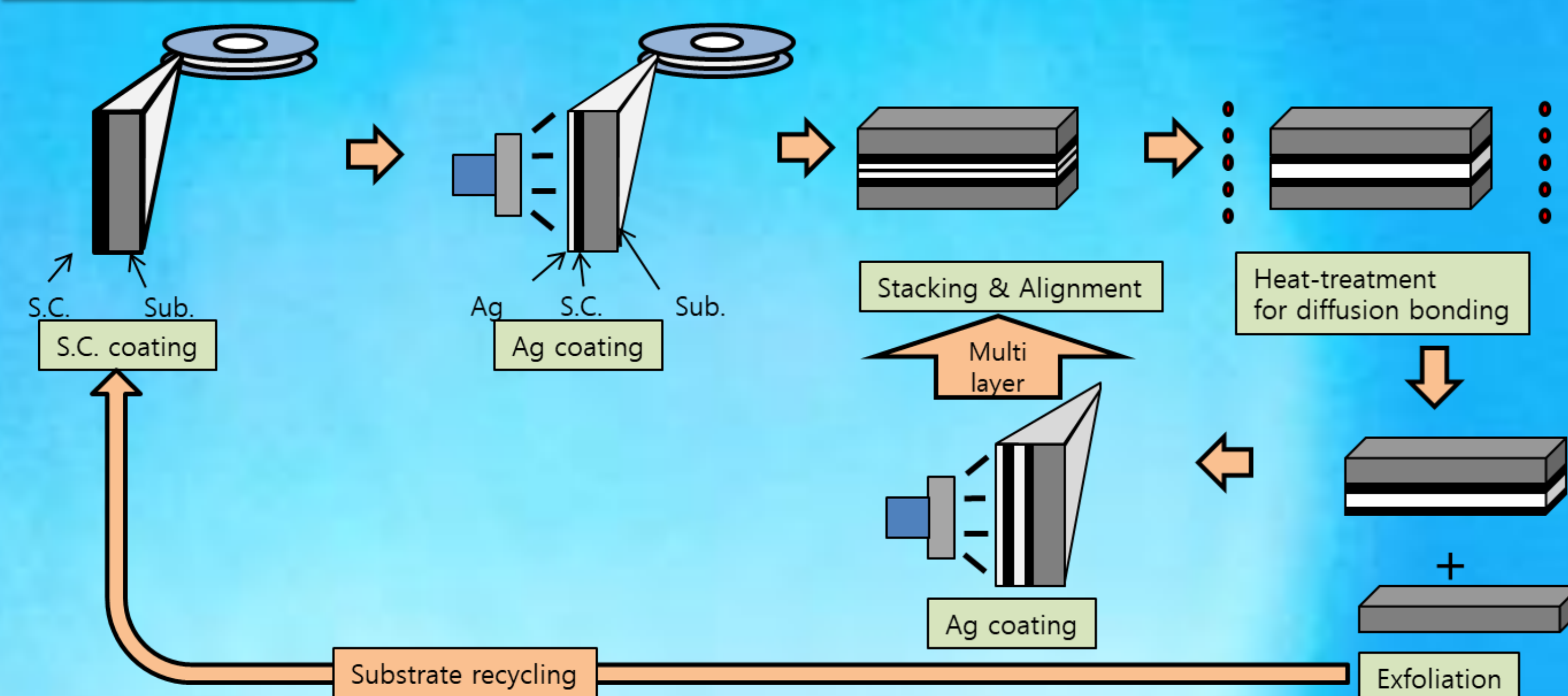
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ABSTRACT

In order to increase the current capacity of a high-temperature superconducting REBCO coated conductor, multilayering of REBCO film was tried using silver diffusion bonding of two commercial HTS coated conductors based on IBAD-MgO substrate. In this study, two types of REBCO tapes with higher and lower vortex pinning force were employed to fabricate two and three HTS layered coated conductor tapes. Critical current density, J_c of multilayered REBCO tapes were investigated under magnetic field of zero to 11 Tesla at various temperatures using both transport and magnetization methods. In-field property of J_c was confirmed to be improved by multilayering of REBCO film. In the magnetic J_c measurement, WL/SL tape showed higher in-field J_c property compared to SL/WL/SL tape. Irreversible magnetic field and exponent δ value were also improved for multilayered tape compared to WL tape. Multilayering using by stronger vortex pinned REBCO layer was found to be effective to enhance the in-field J_c property of REBCO tape with weaker vortex pinned superconducting layer.

EXPERIMENTAL



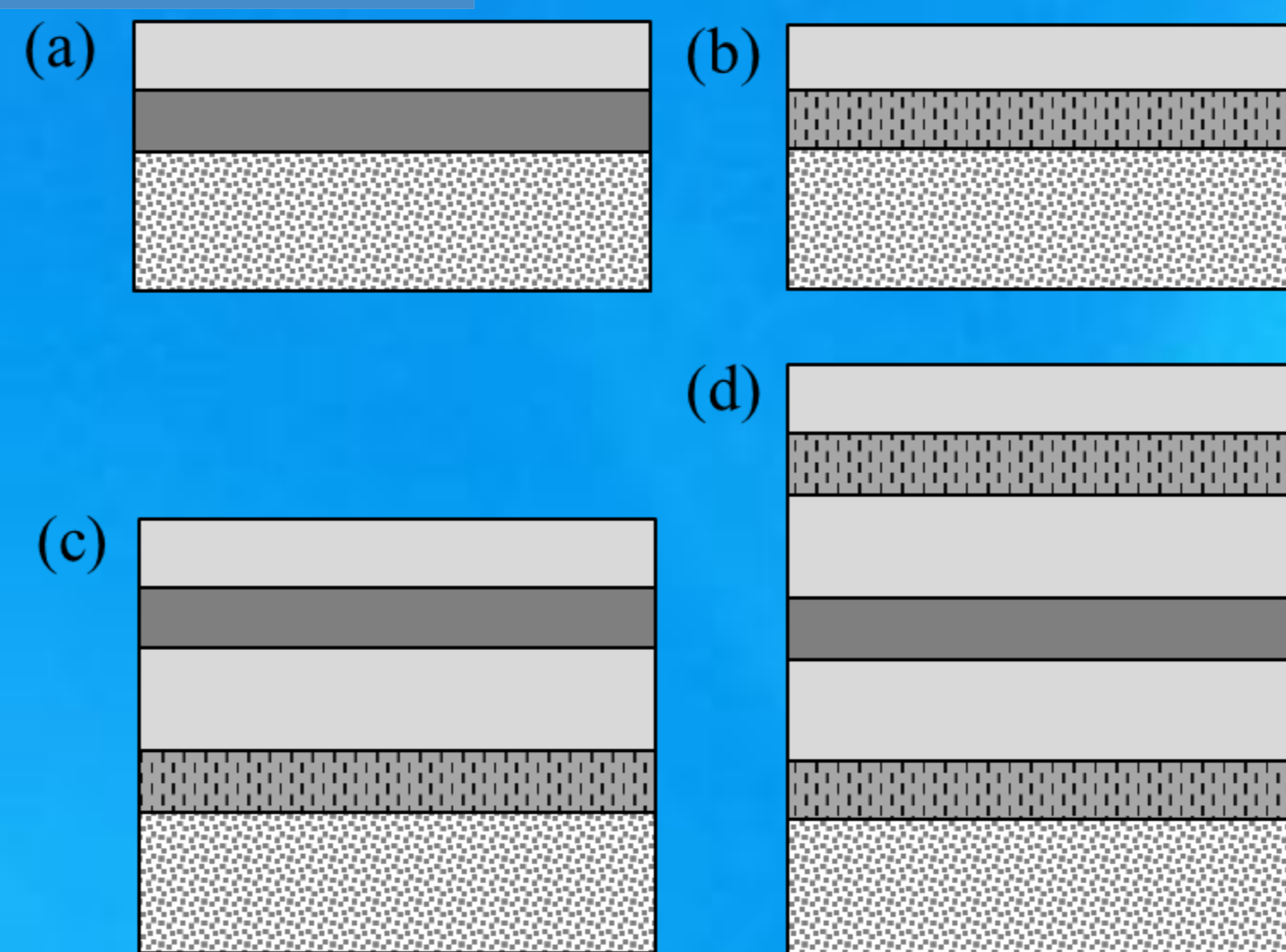
Fabrication procedure of Multi HTS on One Substrate (MHOS) conductor



Purchased REBCO tape

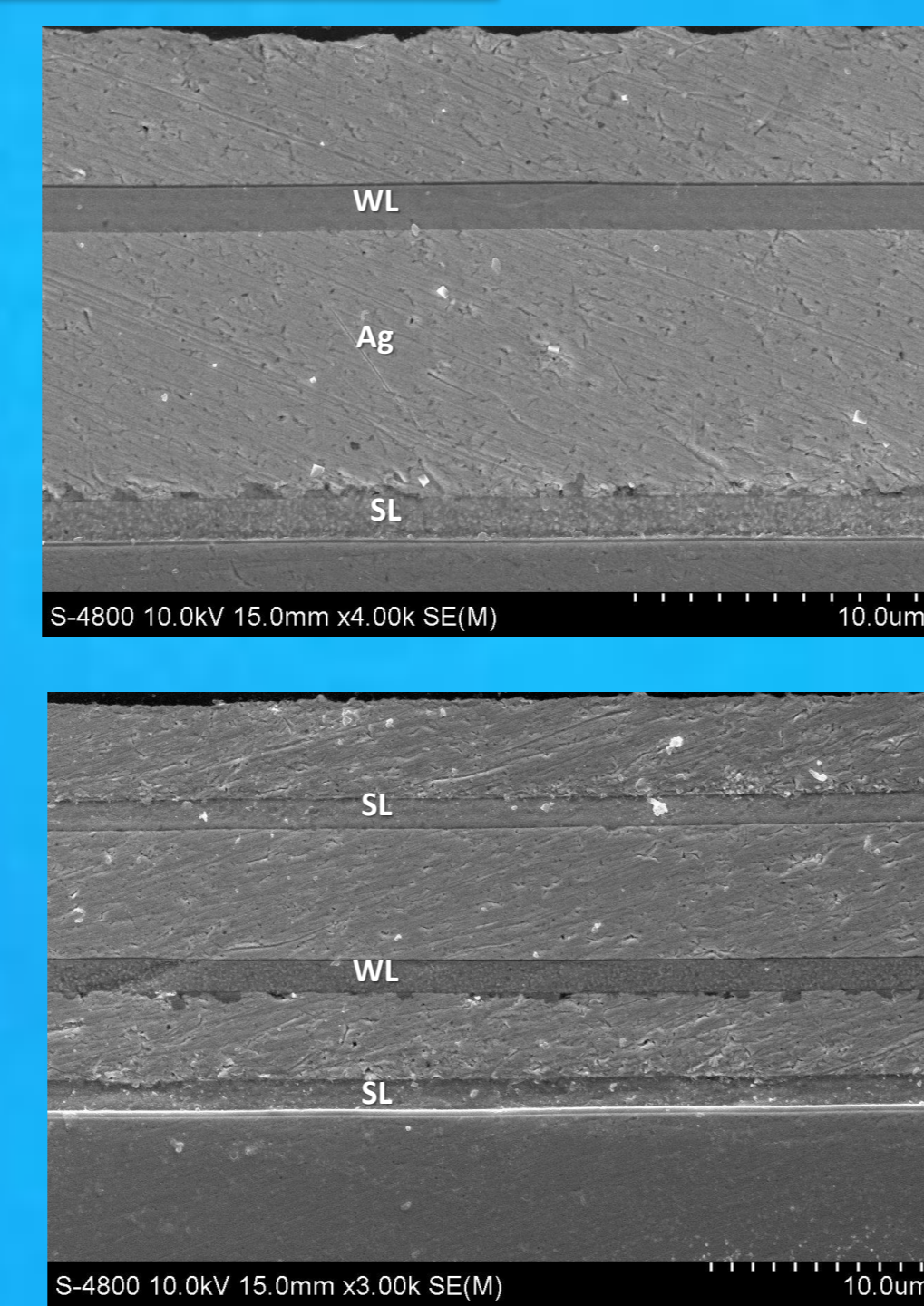
2-SC layered tape

Structure of Sample CC tapes

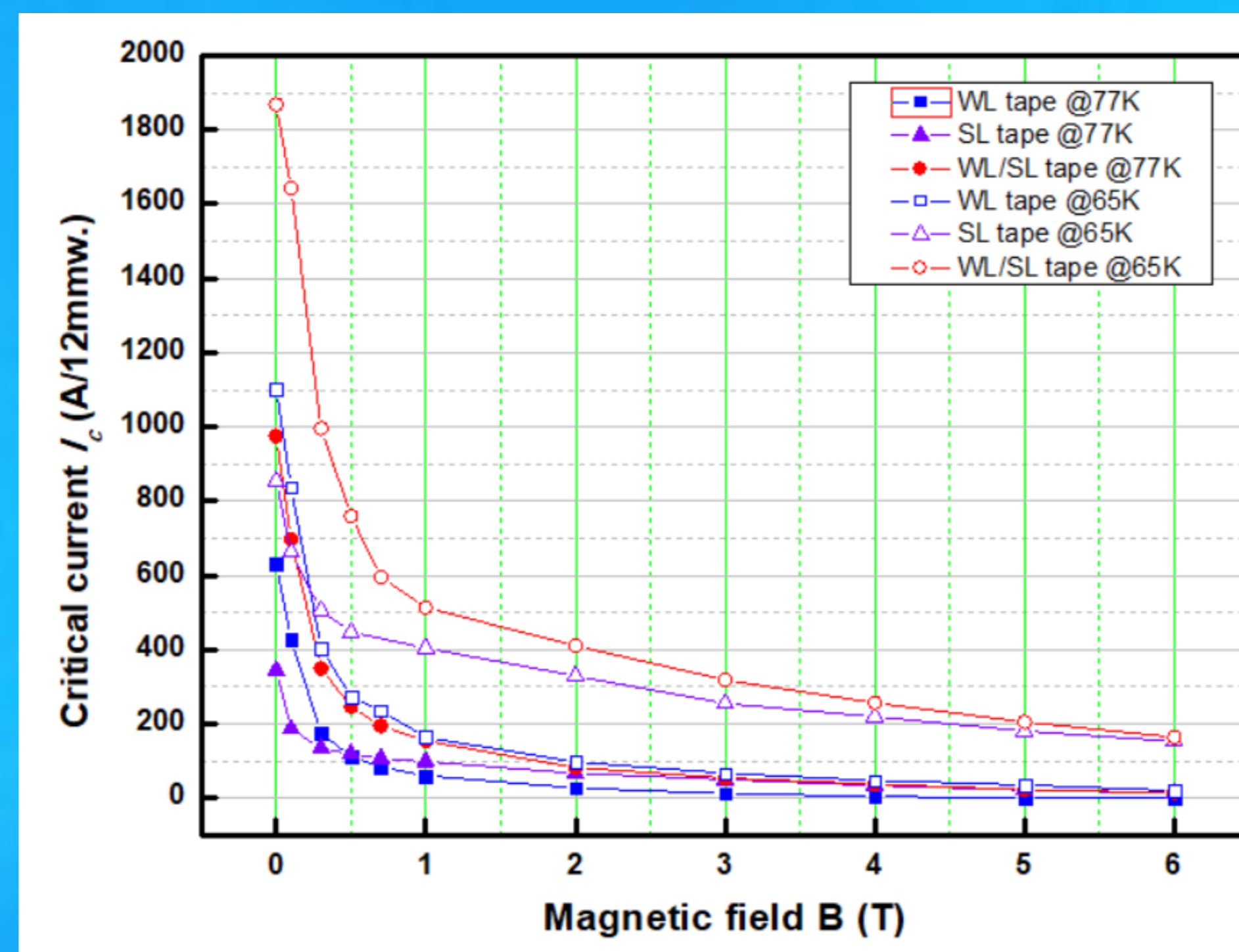


Weakly vortex pinned GdBCO Layer (WL) Strongly vortex pinned GdBCO Layer (SL)
Substrate : LMO/MgO/CeO₂/Al₂O₃ /STS(or Hastelloy) Ag

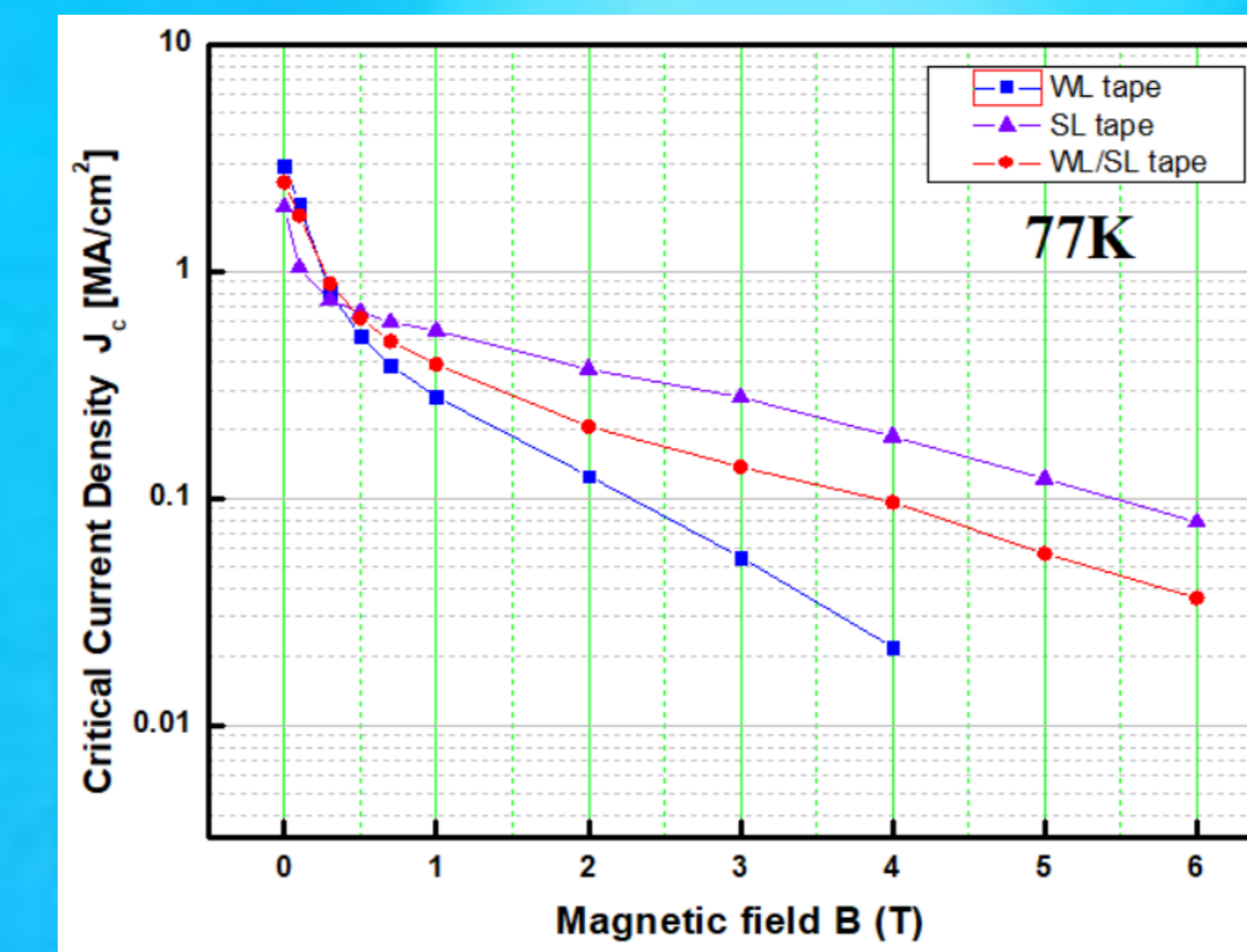
MAIN RESULTS



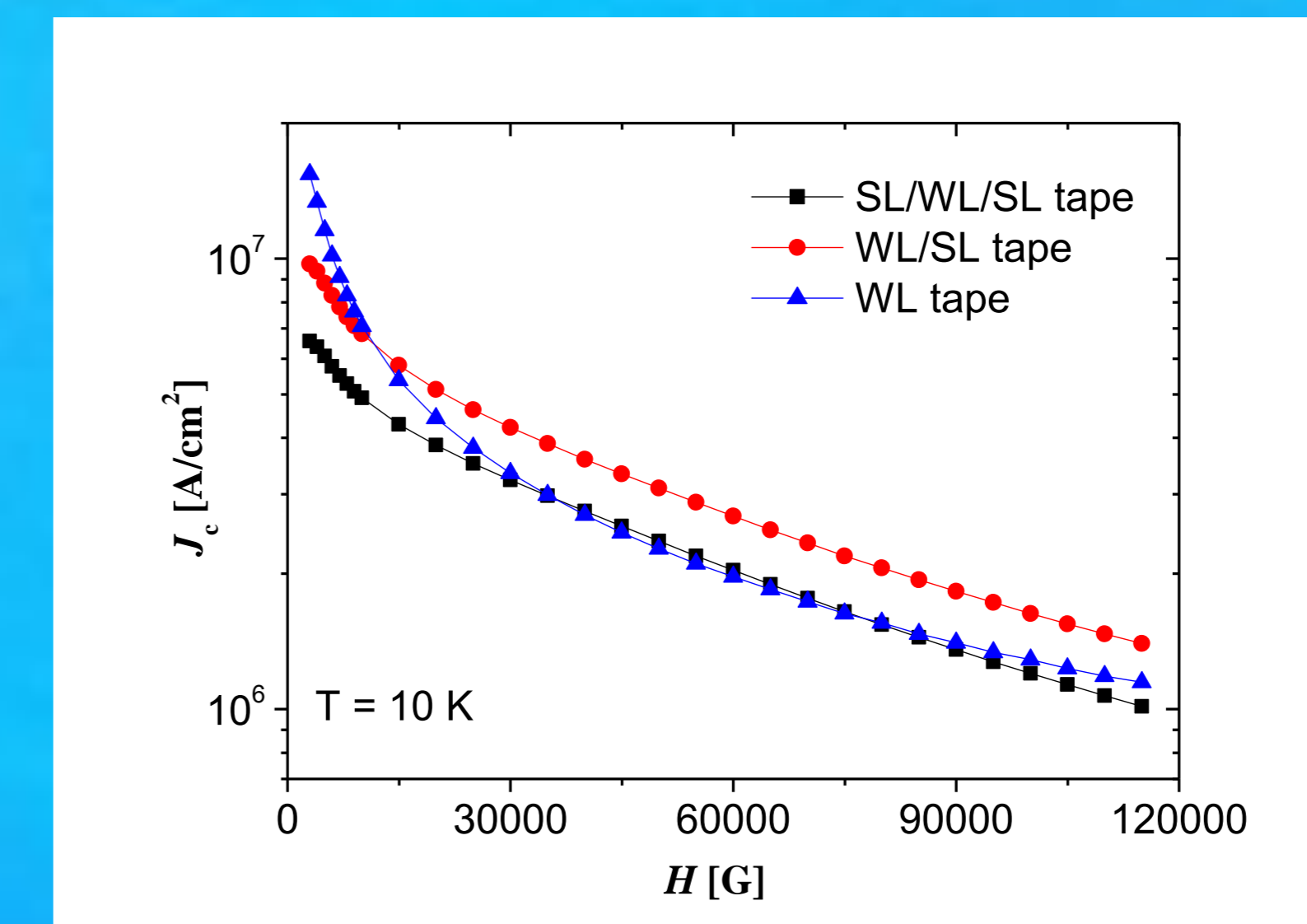
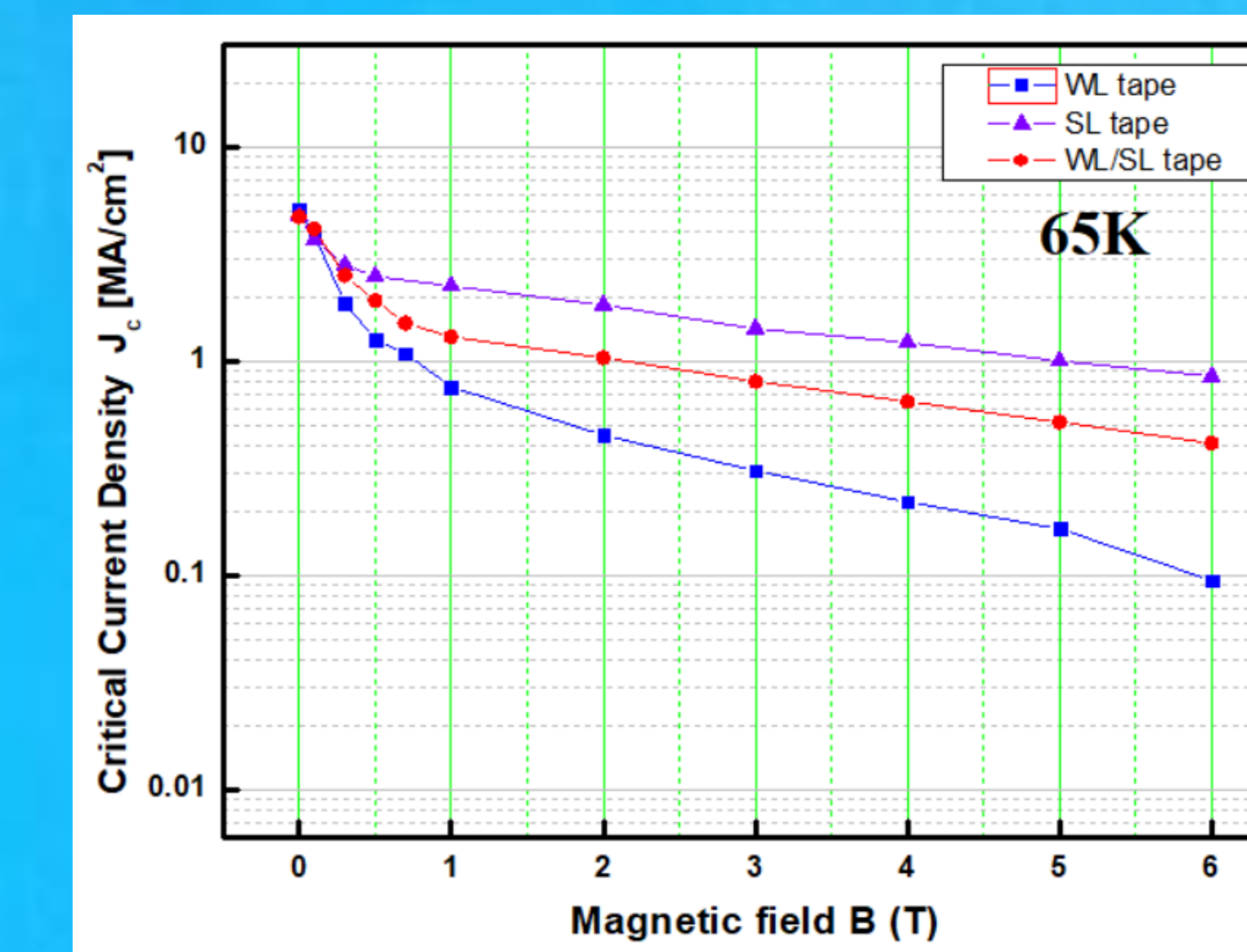
Cross-sectional SEM morphology of WL/SL and SL/WL/SL tapes



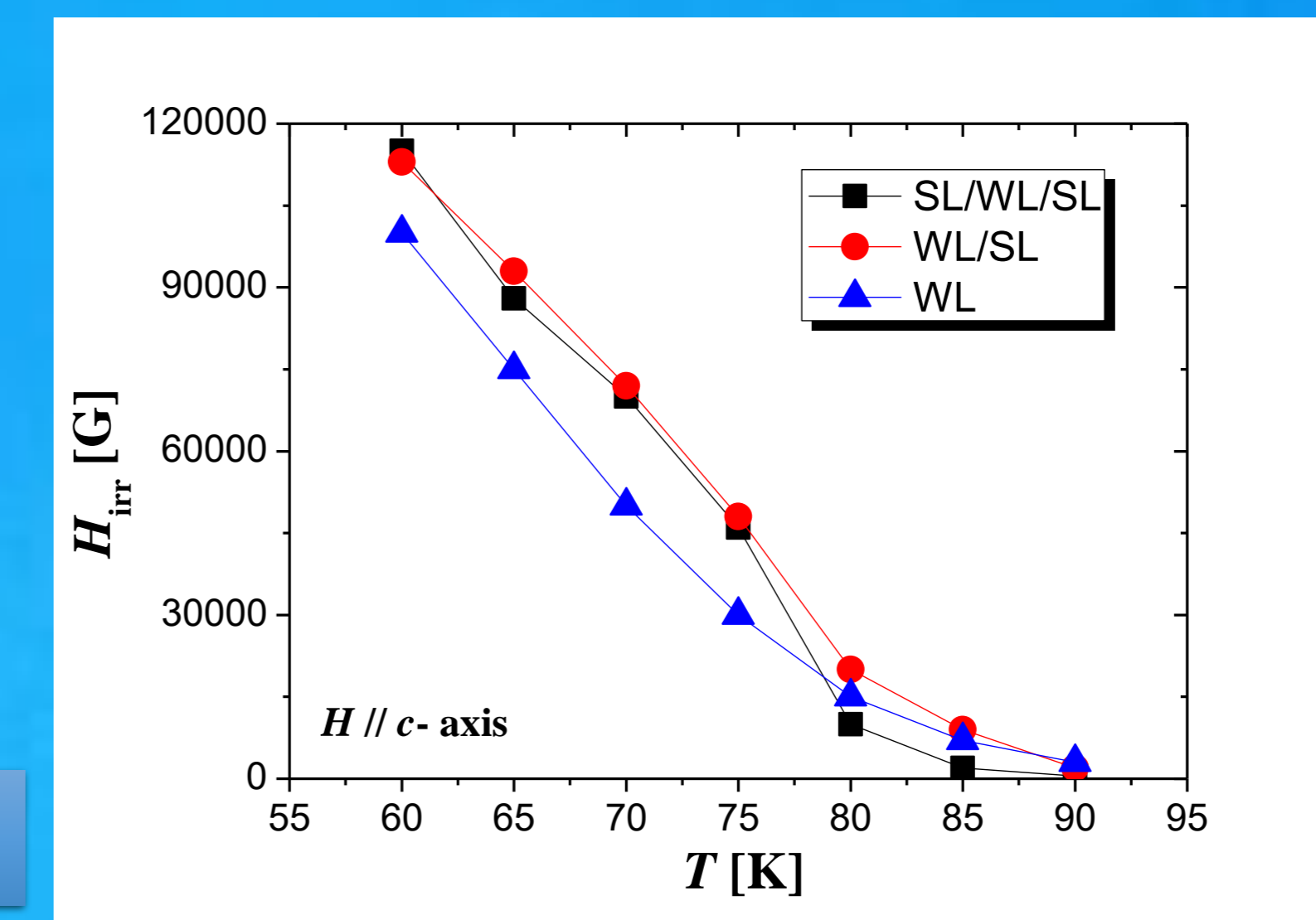
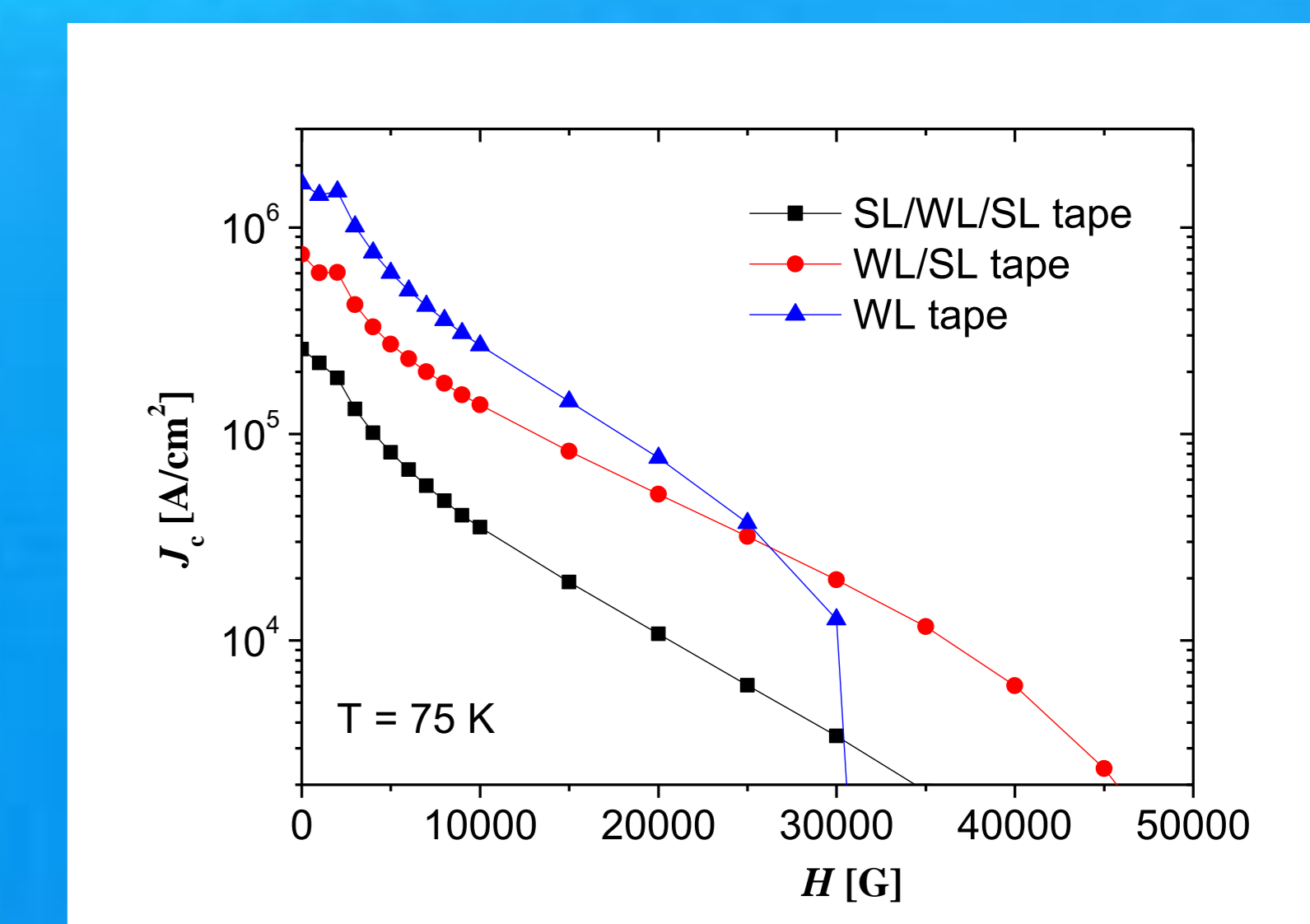
Magnetic field dependency of transport critical current for various sample CC tapes



Magnetic field dependency of transport J_c for WL, SL, WL/SL sample CC tapes



Magnetic field dependency of magnetic J_c for WL, WL/SL, SL/WL/SL sample CC tapes



Irreversible field vs. temperature (left) and exponent δ vs. magnetic field (right) for WL, WL/SL, SL/WL/SL sample CC tapes

