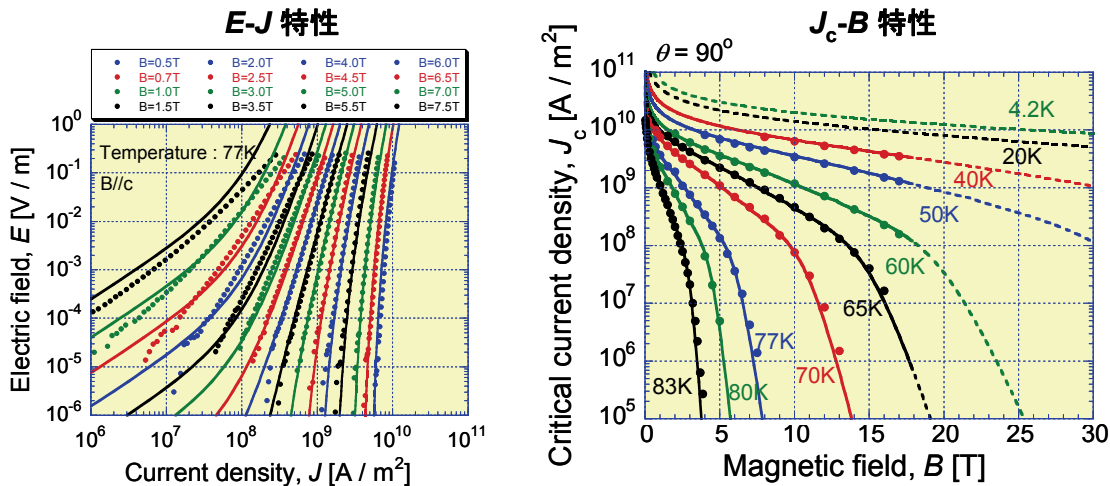


Characterization of Current Transport Properties in $\text{RE}_1\text{Ba}_2\text{Cu}_3\text{O}_{7-\delta}$
Coated Conductors Targeting High Field Magnet Applications
 強磁場マグネット応用を目指した次世代高温超伝導線材の電流輸送特性評価



Based on a physical model describing percolative flux flow in a disordered medium, we have succeeded to describe nonlinear current transport properties in $\text{RE}_1\text{Ba}_2\text{Cu}_3\text{O}_{7-\delta}$ (RE-123) coated conductors as a function of temperature and magnetic field including very high fields more than 30 T. As an example, transport characteristics in a TFA-MOD Y-123 coated conductor are shown, where dots are measurements and lines are analytical calculations. This allows us to design high field superconducting magnet, and related devices taking into account detailed operation conditions.

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Reference: M. Inoue, T. Kiss, D. Mitsui, T. Nakamura, T. Fujiwara, S. Awaji, K. Watanabe, A. Ibi, S. Miyata, Y. Yamada and Y. Shiohara, "Current transport properties of 200 A-200 m-class IBAD YBCO coated conductor over wide range of magnetic field and temperature", IEEE Trans. Appl. Supercond. 17 (2007) 3207.

動作条件によって複雑に変化する高温超伝導線材の電流輸送特性を、パーコレーションモデルに基づき、温度、磁界の関数として定式化した。高磁界マグネットを始めとする、超伝導応用機器の工学設計のための基礎として、今後の応用が期待できる。

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