

Phase relationships of the Coated-Conductor Ba-Sm-Y-Cu-O System

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The main objective of this paper is to provide phase equilibrium data on the single-phase regions of mixed lanthanide HTS phases under conditions that match coated conductor wire/tape processing. By mixing the smaller lanthanides R' with the larger R in the $Ba_{2-x}(R_{1+x-y}R'_y)Cu_3O_{6+z}$ superconductor, both flux-pinning and melting properties can be tailored and optimized. We have studied the range of the $Ba_{2-x}(Sm_{1+x-y}Y_y)Cu_3O_{6+z}$ solid solution under different oxygen partial pressure using x-ray diffraction. Since an understanding of the detailed multi-component phase equilibrium relationships in the vicinity of the superconductor solid solution will allow improvement of coated conductor processing, we have also determined the phase compatibility of the $Ba_{2-x}(Sm_{1+x-y}Y_y)Cu_3O_{6+z}$ solid solution in the quaternary Ba-Sm-Y-Cu-O oxide system. The data will enable improvement of the intrinsic superconducting properties of second-generation wires and facilitates flux-pinning.

- (1) Phase relationships of the Coated-Conductor Ba-Sm-Y-Cu-O System
- (2) Phase relationships in the Ba-R-Cu-O (R=Y and lanthanides) Films