NANOPARTICLES IN $YBa_2Cu_3O_7$ SUPERCONDUCTING THIN FILMS

Susagna Ricart
ICMA (CSIC)
Campus de la UAB, Bellaterra 08193

There is a large number of functional materials were the possibility to have a high contact surface between two dissimilar materials by means of a nanometric structure, give them a high added value. Nanoparticles are considered as essential materials in nanotechnology. Physical and chemical properties of nanoparticles can be varied by changing its size and morphology .In particular, the use of metallic nanoparticles approach has been applied to nanocomposite superconducting layers having high critical currents.

The present communication deals with the preparation of nanocomposite superconducting layers by Chemical Solution Deposition (CSD) using the Metal Organic Decomposition approach (MOD).

There is a close relationship between the composition and shape of nanometric structures and their effectiveness in enhancing the properties of the superconducting material.

There are very few procedures described for the preparation of these nanocomposite materials and, mainly, the first approaches have been recently achieved by physical methods such as Pulsed Laser Deposition (PLD). [2] .

In this communication we present a new approach based in an “all chemical” process using the methodologies for the preparation the superconductor solution precursors. The goal of the present work is to obtain a nanocomposite thin film containing previously or simultaneously synthesized nanoparticles of a non-superconducting second phase (Au, Ag, BZO, CeO_2) in the YBCO matrix using the Metal Organic Decomposition. The general principle of the MOD process is the decomposition of metal organic precursors at 310ºC to obtain a mixture of fluorides, oxides and oxifluorides which are subsequently thermally treated at 795-810ºC to obtain the desired superconductor oxide phase

[1] X.Obradors et al, *Supercond. Sci. Technol*., **2004**, *17*, 1055.
[2] J. L. MacManus-Driscoll et al, *Nature Mat.*, **2004**, *3*, 439.