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Development and Materials **Applications Group**

Production of polycrystalline superconducting ceramic nanowires, using the Solution Blow Spinning technique

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Abstract

The production of a variety of materials at the submicron and nanoscale has been the focus of recent work of several research groups. In superconductors, at these scales, new phenomena arise, e.g., the appearance of resistive states related to the formation of phase slip lines and phase slip centers. From the applications point of view, SQUIDs, single photon, and single electron detectors, have been produced and, due to the existing duality between the phase slip phenomenon and Josephson junctions, current standard devices have been proposed. Lithographic processes and electrospinning technique are commonly used to produce ceramic superconductors at small sizes. In our case, however, the Solution Blow Spinning (SBS), a new, versatile and low-cost method have been applied to produce nano and submicron sized wires. This technique is based on stretching a polymeric solution using compressed air. In this work, we report on the production of polycrystalline superconducting ceramic wires using the SBS technique.

Method	УВСО	BSCCO
Reagents:	(a) 24 (b) 360	









Related Works

1. M. Rotta, L. Zadorosny, C.L. Carvalho, J.A. Malmonge, L.F. Malmonge, R. Zadorosny, YBCO ceramic nanofibers obtained by the new technique of solution blow spinning, Ceramics International 42 (2016) 16230-16234

2. M. Rotta, C. L. Carvalho, M. Motta, W. A. Ortiz, R. Zadorosny, *Controlling the diameter of* YBCO ceramic wires in SBS technique by the injection rate, paper submitted

Conclusions

Wires of BSCCO-2212 and YBCO-123 were produced with diameters in the range of 300-700 nm. SEM images show a polycrystalline morphology of the wires and XRD shows the good quality of the samples, with no secondary phases detected. Magnetization versus temperature curves are suggestive of a possible relationship between the diameter of the wires and the ability of the wire to trap vortices.