

113-021

NANOFIBERS OF YBCO SUPERCONDUCTING CERAMIC PRODUCED BY SOLUTION BLOW SPINNING

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The Electrospinnig (ES) have been used to produce a variety of nanostructured materials in one dimension. Such technique consists in produce nanofibers from polymer solution by applying a high voltage between the solution and the collector. Among the materials produced by ES, the YBCO nanostructured ceramics has attracted great interest due to their superconducting proprieties. Nonetheless, a new, simple and cheap method, which has a great commercial scale-up due to its high injection rate (an order of magnitude higher than the ES) has been used in the fabrication of nanostructured materials known as Solution Blow Spinning (SBS). In this technique, the polymer solution is injected into a stream of accelerated gas that is responsible to stretch the polymer and the solvent evaporation. In this work we report the fabrication of YBCO nanofibers using PVP ($M_w = 360,000$) as the polymeric matrix. The acetates of metallic components (AC) were diluted in acetic acid and added to PVP solution. Two dispersion were prepared: AC/PVP 1:1 w/w and AC/PVP 5:1 w/w. The samples were heat treated at $450^\circ\text{C}/4\text{h}$ and sintered at $820^\circ\text{C}/14\text{h}$ and $925^\circ\text{C}/1\text{h}$ in a constant flux of oxygen gas. The micrographs showed that the YBCO nanofibers were obtained for both concentrations 1:1 and 5:1 with average diameter of 359 nm and 375 nm, respectively. X-ray diffraction shows the formation of pure phase of $\text{YB}_2\text{C}_3\text{O}_7$ -. Concluding, the SBS shows to be an efficient technique to obtain high quality YBCO nanofibers.