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## Influence of $WO_3$ and $MnO_2$ on the Bi-2223 high temperature superconductors, prepared by sol-gel technique

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**Abstract:** The  $Bi_{1.7}Sb_{0.3}Sr_{1.97}Ca_{2.03}Cu_{3.1}O_y$  superconductors are prepared by sol-gel method and the effect of  $WO_3$  and  $MnO_2$  additives on their properties are studied. Structural studies show that the final samples are homogeneous and are mainly composed of 2223 and lower percents of 2212 phases. Analysis of the X-ray diffraction patterns indicate that the penetration of  $W^{6+}$  ions into superconducting phase considerably increases for more than 2 wt% additives. Also, the penetrating  $W^{6+}$  ions preferentially occupy 4e and 2a crystallographic sites of Cu atoms. The electrical measurements show that the best superconducting properties obtain for the sample with 1 wt% of  $WO_3$  additive, while superconductivity is weakened for higher amounts of  $WO_3$ . For the sample with 0.5 wt% of  $MnO_2$  additive, the best superconducting properties are obtained after sintering at 830 °C.

**Keywords:** superconductivity, sol-gel,  $Bi(Pb)SrCaCuO$ ,  $WO_3$ ,  $MnO_2$ .