

ZrO₂ or BaZrO₃ targets are often recommended for the preparation of Y-Ba-Cu-O based superconducting materials. During the heating process of superconducting ceramics, mainly because of their Ba content, they form a very aggressive melt phase which can react with the crucible or with the supporting material. This can cause on the one hand that the crucibles can be damaged very easily. On the other hand the particles dissolved from the crucible could change the composition of the superconducting material and hereby also the physical properties. In the present study the change of phase composition and magnetic properties caused by the chemical reactions and interdiffusion processes between the Y-Ba-Cu-oxide based superconductors with different stoichiometric compositions and the polycrystalline ZrO₂, respectively corundum substrates have been investigated during different annealing programs. The interaction between the superconducting bulk samples presintered at 950 °C and the different substrates was studied at the peritectic decomposition temperature (1010 °C) of the YBa₂Cu₃O_y phase and at 1050 °C. In the case of polycrystalline ZrO₂ substrate the soaking was more intensive than on corundum, but the formation of BaZrO₃ reduced the physical properties of the superconductor in a less degree.

Keywords: ceramic superconductors, doping, firing auxiliaries, BaZrO₃, ZrO₂, crucible, target