

Characterization of BaSnO₃-based ceramics: part 1. synthesis, processing and microstructural development

ABSTRACT

The compound BaSnO₃ together with its Ca- and Sr-analogs, has recently been projected as potential electronic ceramic material (thermally stable capacitor, chemical sensor for humidity, CO and NO_x, etc.). In order to fill the information gaps in the reported research, a vigorous and systematic investigation on these exotic materials has been initiated. A thorough study of BaSnO₃ with respect to its synthesis, processing and microstructural characterization has been made. In order to establish a standard methodology for low-cost mass-manufacturing with identical and beneficial microstructure and reproducible electrical characteristics, different synthesis routes (solid-state and self-heat-sustained) were adopted. Evolution of microstructure which is intimately related to the envisaged properties in the ceramics, was closely and systematically followed in terms of sintering over a wide range of temperatures and soak time. This communication forms the first of two parts in a series of investigations on MSnO₃ systems, where results on the synthesis and processing of δ -phase pure δ -barium stannate (BaSnO₃) and development of interesting microstructure are presented.

Keyword: Barium stannate; Capacitor; Gas sensor; Electronic ceramics; Solid-state; Self-heat-sustained; Microstructure