

Sintering of spinel manganites applying microwaves as an energy source

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Abstract

In the semi-conductor industry there is always a need for shorten the processing time in order to reduce operating costs. For more than five decades, microwaves have been applied to materials and, in some cases amazing results have been obtained, i.e. lower processing temperatures and shorter cycles. The aim of this work was to evaluate microwave sintering as a new method for processing spinel manganites ($\text{Fe}_x\text{Ni}_{0.7}\text{Mn}_{2.3-x}\text{O}_4$) used as negative temperature coefficient thermistors (NTC). The sintering treatment was performed involving either microwaves or a conventional batch furnace. Results prove that it is possible to sinter these ceramics using microwaves as an energy source. Performing a combination of a very short microwave sintering cycle and a thermal treatment in a controlled atmosphere, the electrical resistance characteristics of the microwave and conventional sintered samples are comparable.