EQUILIBRIUM PHASES IN THE Bi_2O_3-RICH REGION OF THE ZnO- Bi_2O_3 SYSTEM

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Varistors manufacturing is one of the most important applications of ceramic materials based in the ZnO-Bi_2O_3 system. This system ZnO-Bi_2O_3 is specially relevant for both the formation of the microstructure that originates the varistor behaviour and the sintering behaviour. However, despite of its technological relevance, many aspects related to these materials remain unclear. Phase equilibrium diagram, specially the Bi_2O_3-rich region of the ZnO-Bi_2O_3 system, is still controversial. The $24Bi_2O_3{\cdot}ZnO$ phase with sillenite structure is reported to be at equilibrium, however recent work by M. Valant and co-workers points to the impossibility of this stoichiometry with such structure. In this work, a set of samples have been studied in order to elucidate this point. Equilibrium phases and thermal behaviour of the samples have been analyzed by XRD, SEM and DTA. Our results show that the stoichiometry at equilibrium is $19Bi_2O_3{\cdot}ZnO$ which is in agreement with the results obtained by Valant et al.