

Nonlinear properties and stability of SnO₂ varistors prepared by evaporation and decomposition of suspensions

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Abstract

SnO₂ varistors doped with CoO, Cr₂O₃ and Nb₂O₅ were prepared by method of evaporation and decomposition of suspensions. The composition of the varistors was optimized to improve electrical properties, such as nonlinearity, leakage current and electrical stability. The best results were achieved with the following composition: 99.15% SnO₂ + 0.75% CoO + 0.05% Cr₂O₃ + 0.05% Nb₂O₅. Obtained samples showed high density, reaching 99.5% of the theoretical density, as well as homogeneous microstructure. The nonlinear coefficient was higher than 30 in the current range from 10⁻⁷-10⁻² A/cm². The leakage current was 0.86 μA/cm². These samples showed high stability of electrical parameters when they are exposed to high current of 27 mA/cm² for different time periods up to 30 min.