Turkish Journal of Physics

Turkish Journal

of

Physics

A Single Junction Barrier Model for Varistors

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Keywords
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Abstract: In this paper, we propose a simplified model that explains the experimental behaviour of the single junction barrier height in varistors. The equation obtained for the barrier height variation versus voltage contains all parameters that characterize the grain boundary and has no adjustable parameters. It allows us to describe the equilibrium state for each voltage level. From this model, it is concluded that the threshold voltage and the nonlinearity coefficient for a single junction barrier are strongly related to the unoccupied traps level at zero bias, when the barrier height at zero bias and the leakage current are related to the filling traps level.

Key Words: Varistors, ZnO, Grain boundary, Barrier height

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Turk. J. Phys., **31**, (2007), 211-215.
Full text: pdf
Other articles published in the same issue: Turk. J. Phys.,vol.31,iss.4.