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Effect of short time reduction on electrical properties of bismuth-silicate glasses

Konrad Trzebiatowski, Joanna Gackowska, Witold Lizak, Leon Murawski

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Abstract

We have investigated the effect of short time reduction on the electrical conductivity of the $70\text{SiO}_2\text{-}25\text{Bi}_2\text{O}_3\text{-}5\text{K}_2\text{O}$ (mol%) bismuth silicate glasses. During a short time heat treatment in hydrogen (about 5 min at 375°C) the surface conductivity increases several orders of magnitude. It is suggested that in these samples the charge carriers transport is an electron hopping between localized states in defected silica films containing small Bi clusters. The influence of bismuth granules on conductivity is visible in the second stage of reduction, which takes place after longer than 4 h reduction time. In this case the conductivity exhibits typical of granular metals behaviour.



280.7 kB

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