Abstract

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Transition Metal Oxide Doped Glassy Systems: Electrical transport and Microstructure

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Abstract

Glassy systems, $0.3V_2O_5$ –$0.7(0.05\ A_mO_n$ –$0.95\ ZnO)$ where, A_mO_n = MoO_3, Nd_2O_3, CdO, and SeO_2 respectively have been prepared by melt quenching route. Crystallite sizes of new phases $Zn_3V_2MoO_{11}$ and $Zn_{2.5}VMoO_8$, $NdVO_4$, $Cd_2V_2O_7$ and $ZnVSe_2O_7$ have been estimated from XRD studies. Average sizes of $ZnVSe_2O_7$ and $Zn_3V_2MoO_{11}$ are found to be maximum and minimum in SeO_2 and MoO_3 doped glassy systems respectively. Bond weakening in SeO_2 doped glassy system is maximum. More number of bond breaking may increase the more number of cluster formation and may offer high resistive path for electron or polaron conduction. The present glassy systems behave as an indirect gap semiconductor. The variation of dc conductivity data with reciprocal temperature indicates small polaron hopping conduction in transition metal oxide glassy system. The electrical measurement data also show that dc conductivity increases with increasing polaron radius. The threshold temperature (T_H) for sharply increasing density of states at Fermi level shows minimum for MoO_3 doped glassy system.

Biography

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