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Temperature Dependent Electrical Conductivity and 1/f Noise in Boron Doped Amorphous Silicon KIRAN SHRESTHA[1], VINCENT LOPES, DALE WHITFIELD, A.J. SYLLAIOS, CHRIS LITTLER, Univ of North Texas — We report on temperature dependent electrical conductivity and noise measurements made on boron doped a-Si:H thin films prepared by plasma enhanced chemical vapor deposition. Samples were grown at various boron concentrations and hydrogen dilution of the silane precursor. Measurements were made at temperatures ranging from 200 °K to 400 °K. We found that in this temperature range the electrical conductivity generally follows the Mott variable range hopping conduction model $\sigma = \sigma\exp[-(T_0/T)^m]$where m = 1/4. For hopping conduction it is found that the noise has a $1/f^n$ component. The exponent, n, in this temperature range is $n \approx 1$, i.e., the noise is 1/f and follows the Hooge model. The normalized Hooge parameter, α_H/p, where p is the carrier density, is correlated to the Mott hopping parameters σ_o, and T, and in turn, to the material dopant boron concentration, hydrogen content, structural disorder as determined by Raman spectroscopy.

[1]Mailing Address: Department of Physics, 1155 Union Circle, #311427, Denton, TX 76203

Kiran Shrestha
Univ of North Texas

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