Abstract Submitted
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Temperature dependent conductivity mechanisms in p-type amorphous silicon thin films*[1] K. SHRESTHA, T.M. BEIG, P. GALI, P. NUKALA, C. LITTLER, V.C. LOPES, U. PHILIPOSE, A.J. SYLLAIOS, Univ of North Texas, L-3 COMMUNICATION COLLABORATION — Temperature dependent conductivity measurements were performed on p-type α-Si:H thin films grown by Plasma Enhanced Chemical Vapor Deposition from 80K to 450K. The purpose of this study was to better understand carrier transport mechanisms in "as- grown" and "annealed" thin films of α-Si. In both samples, the results can be described in terms of two competing, parallel conduction mechanisms, where exponential carrier activation (Arrhenius) conduction dominates at high temperature and a variable range (Mott) hopping conduction dominates at low temperatures. From our analysis, we observed an increase in both the activation energy (from 0.22eV to 0.28eV) and the Arrhenius conductivity prefactor (from 22 Ω-cm^{-1}to 63 Ω-cm^{-1}) as a result of annealing. Since annealing minimize voids and defects, the resulting conduction results from an improvement in the amorphous nature of the material.

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