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Mechanism for conduction in polycrystalline p-type indium oxide films[1] JOLANTA STANKIEWICZ, ICMA, CSIC-Universidad de Zaragoza, FRANCISCO VILLUENDAS, Departamento de Fisica Aplicada, Universidad de Zaragoza, Spain — We report (i)- results from *ac* impedance measurements obtained for intrinsic indium oxide films, grown under O_2-rich conditions, (ii)- current-voltage (I-V) curves for *p*-*n* homojunctions fabricated by sequential growth of a 200 nm thick *p*–type In_2O_3 layer on a 400 nm thick *n*–type In_2O_3, and (iii)- capacitance-voltage (C-V) curves for these junctions. Impedance as well as I-V and C-V measurements were performed under UV irradiation and in darkness. We find two distinct contributions to the *ac* conductivity. One of them is brought about by grain boundaries, and the other one by inversion layers, which are on grain surfaces. In addition, we have found that photocurrents relax extremely slowly in these films. All of this fits consistently within a model in which mobile holes in inversion layers are responsible for *p*-type *dc* conductivity in intrinsic indium oxide films grown under O_2-rich conditions. Such mechanism might be important in other polycrystalline thin films which have a large number of oxidizing defects at grain boundaries.

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