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Local structure and optical and electrical properties of Zinc-Iridium oxide thin films

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Thin films of Zinc oxide with different additives are widely investigated as a potential substitute to ITO. Depending on the additive, the films may exhibit either n- or p-type conductivity. This report focuses on Zinc-Iridium oxide as a candidate for p-type electrical conductor.

The films have been deposited by reactive sputtering from metallic mosaic targets made of Zn and Ir pieces, with Zn 92-96%, Ir=4-8% surface area. The substrate was glass kept at $\approx 310^{\circ}\text{C}$ temperature, the sputtering was conducted at 3 mTorr working pressure and 100W sputtering power. The process was controlled by plasma optical emission spectroscopy, based on Zinc emission line at 480.05 nm and Iridium emission line at 390.2 nm.

The films of Zinc-Iridium oxide are compared to the films of pure Zinc oxide and Zinc-Aluminium oxide. Apart from electrical resistance and optical transmittance measurements, the surface morphology of the films is characterized by AFM, the crystal structure by XRD, and the local structure by EXAFS, respectively.

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