Effect of Working Pressure on Sn/In Composition and Optoelectronic Properties of ITO Films prepared by High Power Impulse Magnetron Sputtering

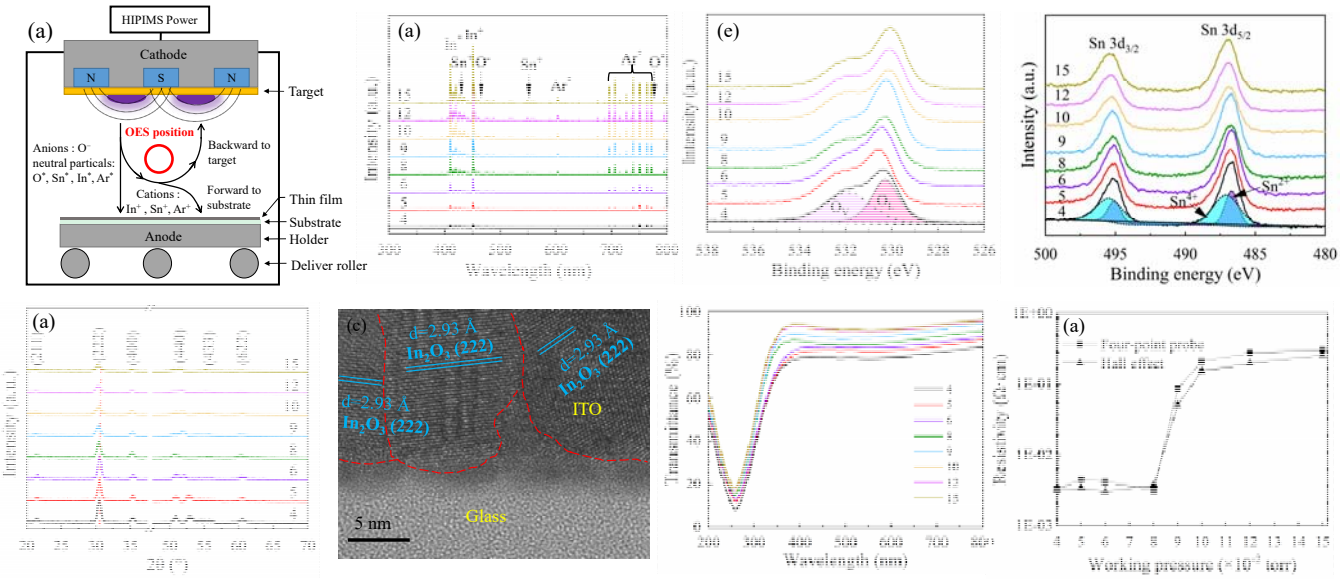
一. 成果完成人及所在单位：张锦法，光电与通信工程学院 导师：赵铭杰、连水养

二. 成果简介：

In this study, Indium tin oxide (ITO) film was prepared by an in-line magnetron sputtering system equipped with a high power impulse power source. The influences of working pressure on the deposition mechanism and properties of the film were investigated. As a result, ITO film with a low resistivity of 3.7×10^{-3} Ω·cm and a high transmittance at 380-800 nm of over 84.7% can be obtained when deposited at a working pressure of 8×10^{-2} Torr.

三. 主要研究内容及创新点：

1. The influence of working pressure in HiPIMS on microstructure, chemical state and Optical and electrical properties of ITO thin films are deeply studied and its performances depend on the excitation/ionization level leading to the presence of high concentration of oxygen vacancies and higher density of Sn^{4+}.
2. By tuning the working pressure, the composition ratio and thereby the electrical and optical properties of ITO film can be tuned.
3. The 8.0×10^{-2} torr, which is very close to this critical pressure, so it can have both suitable oxidation and high doping efficiency. The OES technique has further applied to the optimization of working pressure for high quality HiPIMS ITO deposition.



四. 主要研究成果及应用情况

1. 在 SCI 期刊 VACUUM 上发表论文 1 篇，（中科院 2/3 区；JCR Q1；IF=3.63）
   Ming-Jie Zhao(赵铭杰、指导老师), Jin-Fa Zhang(张锦法、学生一作), Shui-Yang Lien(连水养、课题组老师通讯作者)

联系人：张锦法　　电　话：1823413726　　Email:jfzhang2019@stu.xmut.edu.cn