Effect of plasma power on the structural properties of tin oxide prepared by plasma enhanced atomic layer deposition

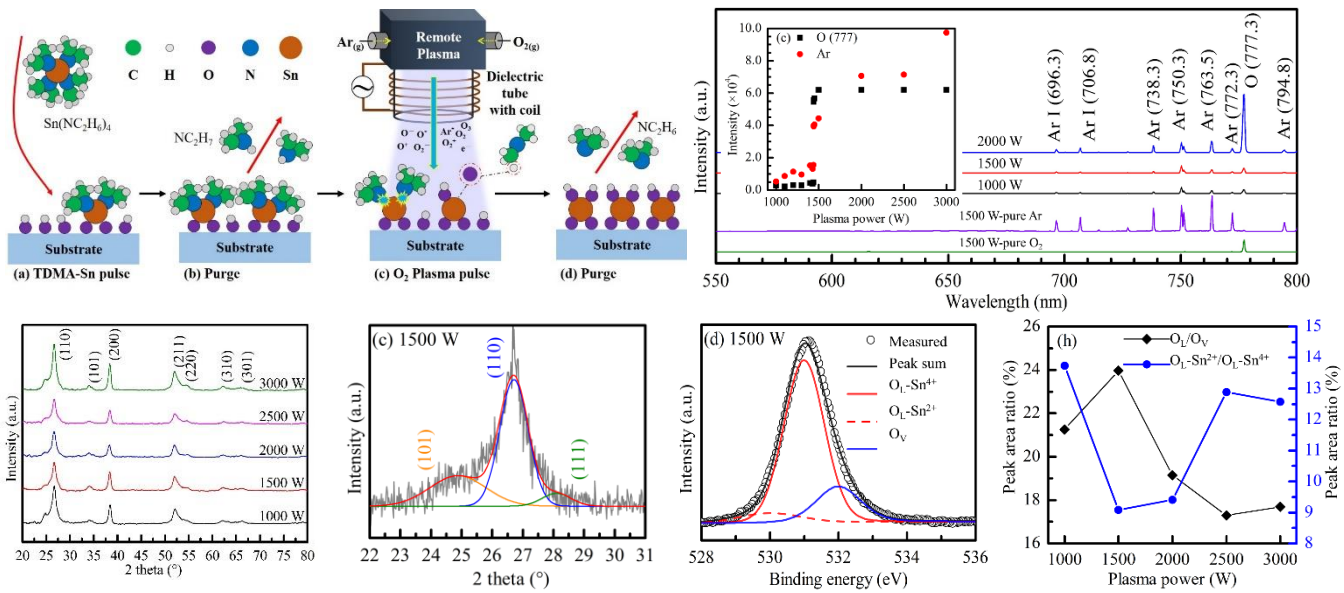
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二. 成果简介：

In this study, tin oxide (SnO_2) films are prepared by using plasma enhanced atomic layer deposition (PEALD) with tetrakis(dimethylamino)tin(IV) (TDMA-Sn) as the Sn metal source and O_2/Ar mixture as the oxidant. The plasma power is varied from 1000 to 3000 W to investigate its influence of oxygen vacancies and defects on the SnO_2 film properties. The experimental results show that the plasma power plays an important role in the deposition of SnO_2 films.

三. 主要研究内容及创新点：

1. The influences of plasma power in PEALD on the grown rate, microstructure, chemical state and electron transportation ability of the SnO_X films are deeply studied and its performances are depended on the metastable presence of Sn_3O_4 with higher or lower density of Sn_{2+} .
2. The XRD and XPS confirm the formation of non-stoichiometric SnO_X, where X = 1.796 is best, and the power of 1500 W is the optimal power for obtaining the high quality and conductive films.
3. The 1500 W, which is very close to this critical power, is thus able to achieve oxidation while having the minimum bombardment. The OES technique has further applied to the optimization of plasma power for high quality PEALD SnO_2 deposition.



四. 主要研究成果及应用情况

1. 在 SCI 期刊 CERAMICS INTERNATIONAL 上已发表论文 1 篇（中科院 2 区；JCR Q1；IF=3.83）

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2. 在 SCI 期刊 Materials 上投稿中论文 1 篇（中科院 3 区；JCR Q2；IF=3.057）

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