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# Influence of alcohol on grain growth of tin oxide in chemical vapor deposition

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**Abstract**

Morphologies of tin oxide micro-grains in the early stage of film growth were analyzed for films deposited by chemical vapor deposition using tin chloride as a source material. Atomic force microscopy observations revealed increased micro-grain density and decreased size by adding methanol into the reaction system, but X-ray photoelectron spectroscopy analyses suggested that the total deposited volume was unchanged. The relative amount of chlorine contamination at the bottom of alcohol-added films increased in the order of isopropyl alcohol < ethanol < methanol. A model of chlorine desorption through reaction with alcohol, which occurred in the early stage of film growth, can explain the results.


*Keywords:* Chemical vapor deposition; Chlorine; Growth mechanism; Tin oxide; Surface morphology