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### The Effect of a High density Plasma on the Surface of IZO Thin Films

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The indium zinc oxide (IZO) is a wide band gap transparent conducting oxide have provoked great interest recently since they have many potential applications, including transparent conducting electrodes, optoelectronics, photonics and sensors. The IZO thin films have attracted great attention because of their excellent optical transmission, high conductivity, chemical stability, thermal stability and low compressive stress. So, the IZO thin films using the various patterning techniques, plasma etching is preferred because it allows a high resolution pattern transfer for optoelectronic device structures. Recently, the deposition process of IZO thin film has been studied extensively and various deposition methods including chemical vapor deposition, sputtering, and sol-gel have been reported. While the growth characteristics of IZO thin films are relatively well optimized, the development of an efficient pattern transfer process remains to be examined. Moreover, the relationships between plasma chemistry and surface kinetics were not explored well. In order to overcome this problem, an understanding of the relations between the surface crystal growth, chemical reaction and plasma properties is required for the low damaged removal process.

In this work, we investigated of IZO thin film using high density plasma (HDP) system. Using the etch characteristic by the previous work, the surface crystal growth in plasma were characterized by X-ray diffraction (XRD). Also, Field emission Auger electron spectroscopy (FE-AES) was used for elemental analysis from the etched surfaces. The surface images of the etched IZO thin films were investigated using Atomic force microscopy (AFM). The patterns of the IZO thin film were investigated using field emission scanning electron microscopy (FE-SEM).

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#### Keywords

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