An analysis of a tilting coating technique affecting on thin film of Indium Tin Oxide nanoparticles characteristics

S. Arunrungrusmi[1], P. Chansri[1], and N. Mungkung[1]

[1]*Department of Electrical Technology Education,King Mongkut's University of Technology Thonburi, Thailand*

Abstract: This study used the tilting coating technique for enhancing high light transmission and low electrical resistance for thin film, Indium Tin Oxide. And optical properties of thin film, indium tin oxide nanoparticles on polycarbonate support sheets. In the experiment when increasing the film thickness resulting in a larger grain size while the light transmission value and lower electrical resistance.

Keywords: Tilting coating, Indium Tin Oxide, Electrical Characteristics.

1. General

In this study will discuss the research results and analyzing the results of the preparation of the thin film, Indian Tin Oxide nanoparticles by Evaporate by the electron beam. To have a nano-bar structure By applying a tilting coating technique and tilting angles and supporting plates. At present, these techniques can prepare nanostructures into columns, inclined columns and zigzag patterns, where the formation of nano-bar structures with physics-based inclination-angle coating techniques depends on the angle between flux of the coating to the supporting sheet And the creation of the adatom diffusion.

2. Experimental setup

The effect of the X-ray diffraction pattern of thin film, indium tin oxide nanoparticles at different thicknesses is 100, 300, 500 and 700 nm, as shown in Fig. 1. Tin oxide at the thickness of 100, 300, 500 and 700 nanometers is arranged in a multi-crystalline form. (Polycrystalline) by showing the diffraction plane (222) at the angle of 2θ is equal to 31.25 degrees corresponding to the X-ray diffraction pattern of indium tin oxide according to the JCPDS database number 01-089-4198 which indicates that it is Cubic bixbyite crystal structure, while the X-ray diffraction pattern at 52.5 degrees is the peak position of silicon used as a supporting material. This study investigated the effect of the temperature of glass plates at room temperature and 80 degrees Celsius, affecting the crystal structure of thin film, Indium Tin Oxide nanoparticles found that the arrangement the body of the Indiumoxide crystal is improved

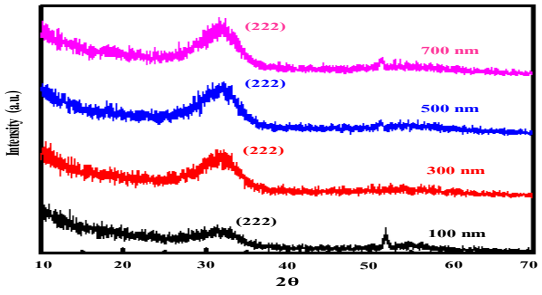

Figure 1. X-ray diffraction pattern of thin film, Indium tin oxide nanoparticles at the thickness of 100, 300, 500 and 700 nm

3. Results.

The angle of the nano-bar structure is angled to the plane of the sheet supporting the silicon less than the theoretical calculated angle. May be caused by coating conditions such as coatings pressure in the coating chamber, warm up of the supporting sheet The angle distribution between the coating and the support sheet Which is approximately 2 degree. The arrangement of the film that is coated as a column column due to the occurrence of the obscure phenomenon (Shadowing effect) results in the atom OK on the support sheet And not combined into a film layer Resulting in the appearance of nano-column bars that are separated, and the occurrence of obscuring phenomena also results in a porous and low density film as well.

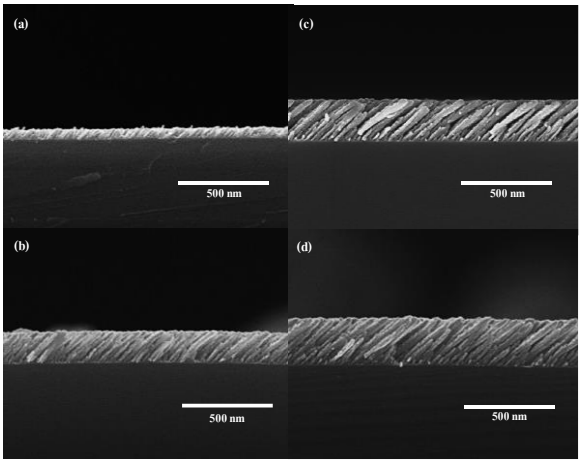

Figure 2. Cross-sectional photos of thin film, indium tin oxide nanoparticles at thickness (a) 100 nm, (b) 300 nm, (c) 500 nm and (d) 700 nm

References

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