FABRICATION OF ANTIMONY-DOPED TIN (IV) OXIDE CONDUCTIVE GLASS

by

FEBY ESCANDA CARMEN

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College of Arts and Sciences
University of the Philippines Visayas
Miag-ao, Iloilo

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ABSTRACT

Fabrication of Antimony Doped Tin (IV) Oxide Conductive Glass

Antimony doped tin oxide conductive glass slide (ATO-CG) was fabricated using Chemical vapour deposition (CVD) based method developed in the laboratory. Three deposition parameters were considered: (a) concentration of antimony dopant, (b) amount of coating solution used, and (c) sintering temperature. Resistance was measured using a digital multitester and the percent transmittance was determined using Spectronic 21, UV-Vis Spectrophotometer of UPV Department of Chemistry. The ATO-CG slide which gave the highest conductivity and transmittance for all the deposition parameters (@ 0.29% Sb dopant, 2 mL Sn:Sb solution and 500° C) was tested for its performance by exposing it to high frequency vibration and heat based on the operating condition used for Dye-Sensitized Solar Cell (DSSC).

Results obtained showed that at lower concentration of antimony dopant, R decreases while T increases as volume of Sn:Sb solution increases. At higher concentration of dopant, R increases while T decreases as volume of Sn:Sb solution increases. Increasing temperature causes a decrease in R and an increase in T but beyond 500° C the trend changes inversely.

Doping of Sb could increase conductivity and transmittance at specific range of Sb concentration added, which was observed to be at 0.29% to 0.58% Sb concentration on this study.

Results of the sonication and application of heat proved that ATO-CG slide can be used as component of DSSC because it offers high mechanical stability as well as good conductivity.