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The effect of $Ar+H_2$ plasma on the low temperature ITO film synthesis on polymer

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The indium tin oxide (ITO) films have mainly beenused for transparent conducting electrodes in flat panel displays and touch panels. Recently ITO films deposited on polymer substrates have received a lot of spotlights for their applications in mobile devices due to lightweight, small volume and flexibility compared with those deposited on glass substrates. However, it is difficult to obtain satisfactory film properties because of the restriction on the substrate temperature during deposition process. In other words, it is hard to obtain the resistivity and transmittance at the lower temperature as good as those at the higher temperature.

In this work, to overcome this drawback, ITO films were prepared on glass and polymer substrates by asymmetric bipolar pulsed d.c. CFUBM(Closed Field Unbalanced Magnetron) sputtering at room temperature. By controlling pulse parameters, it is possible to prepare the good films properties at low temperature. Moreover, it was confirmed that electro-optical properties of films were improved by hydrogen dilution process. And to investigate the influence of hydrogen on electro-optical properties of ITO films, we analyzed a variety of ion fraction changes in the generated plasma with hydrogen partial pressure using optical emission spectroscopy (OES). As a result, the average resistivity of 0.75 mΩ?cm and the average transmittance of 86 % were obtained on polymersubstrate.

Referee

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