

PLASMA POLYMERIZED COMPOSITE THIN FILMS PRODUCED BY DOUBLE DISCHARGES TECHNIQUE

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We report herein the characterizations of thiophene and pyrrole composite thin films synthesized by using a plasma based electron beam generator which has a fast filamentary discharge formed from the superposition of an ordinary low-pressure dc glow discharge and high-current pulsed one. Glass and ITO (indium tin oxide) substrates were coated at a pressure of 1 mbar, 19 kV pulsed and 2 kV dc potential. The substrates were located at different regions in the reactor to evaluate the influence of the position on the molecular structure of the obtained thin films. To our knowledge, such composite thin films are synthesized for the first time by such technique.

The molecular structure of the thin films was investigated by XPS, UV-visible, FTIR and the morphological studies carried out by XRD and SEM. The XPS, UV-visible and FTIR results reveal that the molecular structures of the synthesized thin films are different from that of the conventional one due to the fragmentation of the monomer during the film formation at plasma processes. The morphology of the synthesized thin films has some fractional crystallinity and having granular structures with different size depending on the location of the substrate.