“Application of clay film to light-emitting devices and solar cells”

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Generally, plastic substrates, such as PET, PC, polyimide, etc., are being used for flexible device applications. However, a very suitable transparent flexible substrate for solar cell and OLED applications is clay; it is due to their flexibility, lightweight, high thermal resistance and gas barrier properties. In this paper, we discuss the preparation and characterization of dye-sensitized solar cells (DSSC) and organic light emitting diodes (OLED) on transparent flexible clay substrates. Review reports suggested that the power conversion efficiency of DSC based on TiO_2 nanotube arrays was higher than that of DSC based on TiO_2 nanoparticles due to direct transfer of electrons from dye to electrode. In the present work, we study the effect of anodization potential on the performance of semitransparent flexible TiO_2 nanotube array films for flexible DSSC applications. Finally, we report the preparation method of transparent flexible clay substrates, and the effect of substrate surface roughness on light emission properties of OLED device based on transparent flexible clay substrates.