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CHARACTERISTICS OF LOW-TEMPERATURE PROCESSED DYE-SENSITIZED SOLAR CELL BY ELECTROCHEMICAL IMPEDANCE AND PHOTOCURRENT-PHOTOVOLTAGE TRANSIENT SPECTROSCOPY

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In this study, a TiO2 colloidal sol was synthesized by sol-gel process, which was used as a "glue" agent to enhance interconnection of TiO2 particles in low temperature process for plastic dye sensitized solar cell. The crystalline phase of this TiO2 glue is pure anatase with average particles size of 5 nm, which was characterized by powder X-ray diffraction and high revolution-TEM. The viscous alcoholic paste without any organic binder was prepared from the mixture of commercial P25 powder and glue. Paste composition and sintering process parameters were optimized for high photovoltaic performance based on low temperature process. The electrochemical impedance spectroscopy and photocurrent-photovoltage transient spectroscopy were also employed to investigate the mechanism of electron transport in this binder free TiO2 film system.

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