

D. Kumar, A. Bist, P. Dua, P. Kuchhal, G. Anand and K.P.S. Parmar

Facile one-pot hydrothermal synthesis of nanorice-like TiO₂ for an efficient dye-sensitized solar cell (DSSC)

ABSTRACT. Highly crystalline TiO₂ powder consisting of morphologically rice-like nanoparticles is synthesized by a simple hydrothermal process using a premixture of titanium isopropoxide, ethanol and aqueous ammonia. An efficient mechanism decoupling hydrolysis and condensation promotes the formation of a rice-like morphology. As the average particle size and BET properties of nanorice-like TiO₂ were found to be quite similar to a commercially available TiO₂ (Degussa P25), their photoelectric properties were compared as a DSSC electrode. Under 1 sun irradiation the photovoltaic efficiency of nanorice-like TiO₂ was measured to be *c.* 20% higher in contrast to the mediocre efficiency (~5.45%) of P25. We suggest that together with a generally exploited reference, such nanorice-like TiO₂ could also be adopted as a model material for various applications.

Nanotechnology Perceptions **15** (2019) 58–64

doi: 10.4024/N03KU19A.ntp.15.01