Supporting Information

Amino acid assisted synthesis of mesoporous TiO_2 nanocrystals for high performance dye-sensitized solar cells

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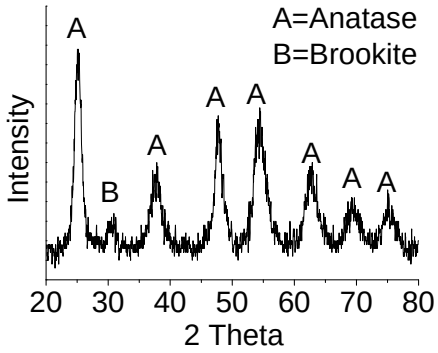
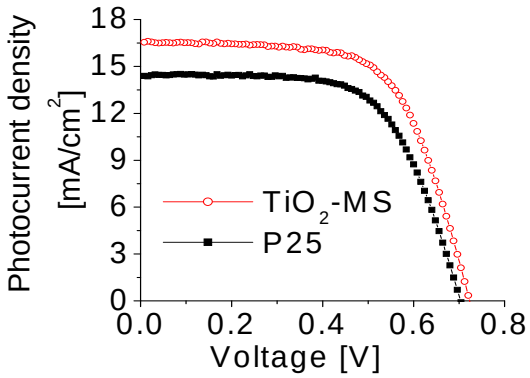
Experimental Section:

Synthesis: 36.5 mg of L-lysine was dissolved in the solution containing 35g of deionized water and 1.83 g of octane with stirring at 60°C. 4.25 g of titanium iso-butoxide $Ti(O^iBu)_4$ was added to the mixture with stirring at 60°C. The final molar composition in the solution was 1 $Ti(O^iBu)_4$: 0.02 L-lysine: 1.28 octane: 155.5 H_2O. The resulting mixture was stirred for 20 h at 60°C followed by being kept statically at 100°C for 24 h. Thus obtained sample was calcined in furnace at 350°C to remove any organic residuals.

Fabrication of DSSCs: Both mesoporous TiO_2 nanocrystals (TiO_2-MS) films and Degussa P25 flims were prepared by doctor blading and subsequently annealed at 450°C for 30 min to remove any organic species and improve the inter-connection between the particles and the contact between the TiO_2 film and FTO substrate. The average thickness of the films was *ca.*10μm. Then the resulting film was soaked in N719 dye solution (0.5mM, 1:1 (v/v) mixture of acetonitrile (HPLC, Lab-scan) and tert-butanol (LR, Ajax Chemicals), Dyesol) for 24h. Subsequently, the dye-covered TiO_2 electrode were assembled with Pt-counter electrode (Dyesol) into a sandwich type cell and sealed with a spacer of 30 μm thickness (Surlyn, DuPont) with a drop of the I^-/I_3^- organic solvent based electrolyte (EL-HPE, Dyesol) introduced via vacuum back-filling.



S-Fig.1 Wide-angle XRD pattern of TiO_2-MS.



S-Fig.2Photovoltage–current characteristics of DSSCs prepared by using TiO_2-MS and P25 photoanodes under a solar simulator (AM 1.5, 100 mW cm^{-2}).