

## **Aminoacid-Assisted Synthesis of TiO<sub>2</sub> Nanocrystals with Controllable Shape and Size: A Novel Agent for the Fabrication of MEH-PPV/TiO<sub>2</sub> Photovoltaic Materials**

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Photovoltaic (PV) devices based on conjugated polymers have become attractive for use in inexpensive large area and low weight devices. However, for practical applications, several factors limit the efficiency, especially the low mobility of charge carriers, particularly electrons. To improve this limitation, nanocrystalline Titanium dioxide (TiO<sub>2</sub>) with its chemical stability, easy control of size and shape, proper band gap and low cost, is considered as one of the most promising materials for efficient electron transport. The main objective of this work is i) to synthesize TiO<sub>2</sub> nanocrystals (NCs) and ii) to optimize the dispersion of these NCs into conjugated Poly[2-methoxy-5-(2'-ethylhexyloxy)-p-phenylene vinylene] (MEH-PPV) polymer in order to develop hybrid MEH-PPV/TiO<sub>2</sub> films for photovoltaic cells. Various routes have been developed to synthesize TiO<sub>2</sub> nanocrystals through the solvo/hydrothermal reaction of commercial titanium dioxide nanopowders or titanium butoxide in the presence of selective capping agents (e.g., amino acid and decanoic acid) at temperature varying between 100 and 180°C. The various shapes of such TiO<sub>2</sub> crystals (including nanorods, nanotubes, microspheres, hollow microspheres, quasi-nanospheres) have been controlled by changing the reaction parameters. In the second step of this work, the effect of the shape and size of TiO<sub>2</sub> NCs on the efficiency of MEH-PPV/TiO<sub>2</sub> photovoltaic materials will be investigated.