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Self-standing
Hybrid Nanofibers of TiO2 and TiO2/Hydroxyapatite: Application in Photocatalytic and Photovoltatic Systems PARVANEH ROUHANI, Physic Department, Sharif University of Technology, Tehran, Iran, NIMA TAGHAVINIA TEAM, MASOUD RAHMAN TEAM, LEYLA SHOOSHTARI TEAM — A Hybrid fibers of Hydroxyapatite TiO_2, HAp/TiO_2 with modified photocatalytic properties were synthesized using a template method. Liquid phase deposition (LPD) technique was employed to grow TiO_2 layers on cellulose fibers, followed by deposition of HAp from a pseudo body solution, and finally heat removing the cellulose template. The resulting material has a fibrous structure, mimicking the cellulose fibers shape, and have a typical surface area of 114 m^2/g, compared to 74 m^2/g for pure TiO_2 fibers. Adsorption and photocatalytic degradation tests showed that addition of HAp to TiO_2 fibers increased the adsorptive from 17% to 35%. Nano particulated TiO_2 fibers as one-dimensional long structures were introduced into TiO_2 P25 nano particle films using co-electrophoretic deposition. This resulted in less porosity and higher roughness factor of the films that provided more favorable conditions for electron transport. The films used as the photoanode of a dye solar cell (DSC) produced 65% higher photovoltaic efficiency. TiO_2 fibers can be excellent binders in single-step, organic-free electrophoretic deposition of TiO_2 for DSC photoanode.

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