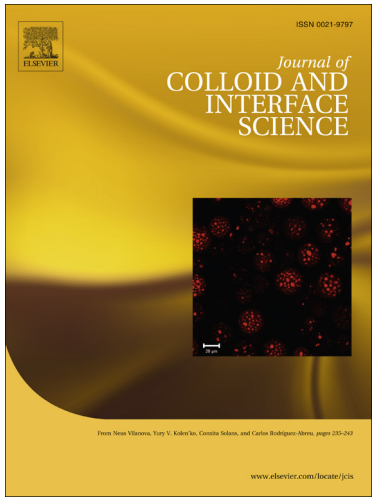

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Studies on effect of temperature on synthesis of hierarchical TiO_2 nanostructures by surfactant free single step hydrothermal route and its photoelectrochemical characterizations

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Abstract:

Exotic hierarchical rutile TiO_2 nanostructures are synthesized by surfactant free single step hydrothermal route. The effect of reaction temperature, ranging from 140^{o}C to 200^{o}C on the properties of the synthesized rutile-TiO_2 is investigated. The synthesized rutile-TiO_2 nanostructures are characterized using X-Ray diffraction, X-Ray photoelectron spectroscopy, Raman spectroscopy, UV-Vis spectroscopy and Scanning electron microscopy techniques. The deposited TiO_2 samples are found to be photoelectrochemically active and the best photoelectrochemical performance (0.95 ±0.05%) is obtained for the sample deposited at 180^{o}C. A possible temperature dependent growth mechanism resulting in photochemically active TiO_2 nanostructure thin films is proposed.