Title of Abstract: Fabrication of Visible Light Sensitive Electrospun TiO2 Nanofibers Using Squaric Acid for Photocatalytic Application

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Abstract : Degradation of organic pollutants using photocatalysts has gained utmost importance, due to the increasing environmental pollution. Despite various attempts to improve the photocatalytic efficiency of well-known photocatalysts such as titanium dioxide (TiO2), by making them visible light active, various issues need to be resolved. In this work, attempts have been made to improve the visible light absorption capacities of the electrospun TiO2 nanofibers by modification using squaric acid (SqA). An interfacial charge transfer complex is formed by the condensation reaction between the hydroxyl groups on the surface of the TiO2 nanofibers and the SqA ligand. Various characterizations confirmed that the modification using SqA had led to the formation of the interfacial charge transfer layer, without affecting the crystallinity or morphology of the TiO2 nanofibers. The modified TiO2 nanofibers showed sensitivity to visible light with red shift in the optical absorption. It exhibited an improved photocatalytic efficiency of 85% against the degradation of tetracycline, compared with 60% for unmodified TiO2 nanofibers. It also showed an increased rate of degradation of 0.21 mg/L/min, when compared with the 0.13 mg/L/min of unmodified TiO2 nanofibers.

Keywords : TiO2 nanofibers, crystal structure, photocatalytic performance, organic pollutants
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