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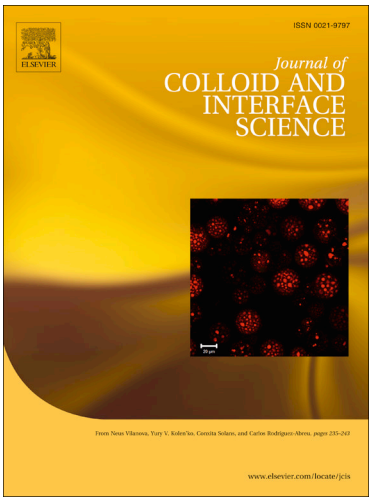

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Three-dimensional titanium dioxide/graphene hybrids with improved performance for photocatalysis and energy storage

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Abstract

A series of three-dimensional (3-D) TiO_2/graphene (TiO_2/GR) hybrids with different TiO_2 weight ratios were prepared using a self-assembly approach followed by the gaseous reduction in a hydrothermal system. The method was based on the electrostatic attraction between the positively charged titanium glycolate precursor and negatively charged graphene oxide in an aqueous medium without any surfactant or template. The structure, morphology, physical and optical properties of the as-synthesized hybrids were characterized, and the results showed that TiO_2 spheres were homogeneously confined within the 3-D networks of graphene, and acted as pillars to effectively separate the graphene sheets from each other. By optimizing the ratio of TiO_2 in the hybrids, the material was identified as an excellent photocatalyst to remove organic compound in water with high degradation efficiency.