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Preparation of a photoactive 3D polymer pillared with metalloporphyrin

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Among the very few efforts for the preparation of stable pillared graphene nanostructures, there is no report of tin porphyrin intercalated between TiO_2–graphene (TG) nanosheets. Graphenes and other natural sheets, because of their longrange order, are often referred to as two-dimensional (2D) crystals. Chemists, who tend to think of compounds and covalent bonds, may instead look at them as 2D macromolecules or 2D polymers. Defect-free graphene has an infinite number of repetitive elements, with the smallest being any of its sp^2-hybridized carbon atoms, whose one p orbital and three sp^2 orbitals are filled with one electron each. These carbon atoms correspond to the smallest repetitive chain segments representing the repeating units of common linear polymers. In this work, we intercalated a tin complex of tetrakis (4-carboxyphenyl)porphyrin (SnTCPP.Cl_2) between TiO_2–graphene nanosheets (TGSP) with 3% graphene content (TG (3%)). The principal objective of the present research is to prepare an efficient visible-light photoactive compound to significantly use visible light in the photocatalysis system. The photoelectrochemical investigations determined that the tin porphyrin photosensitizer effectively produces more charge carriers within the pillared nanostructure to enhance light induced current. Thus, the pillared graphene nanostructure of TGSP can efficiently enhance the photocurrent generation of the modified electrode undergoing visible light irradiation.

Biography

Rahmatollah Rahimi has completed his PhD from Howard University in Inorganic Chemistry. He was the Dean of Chemistry department at Iran University of Science and Technology from 2010 to 2014. He was Supervisor of Iranian Chemistry Olympiad team in Italy with Commission of Education Ministry in 1992. He has published more than 120 papers in reputed journals and more than 200 article in several conferences.

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