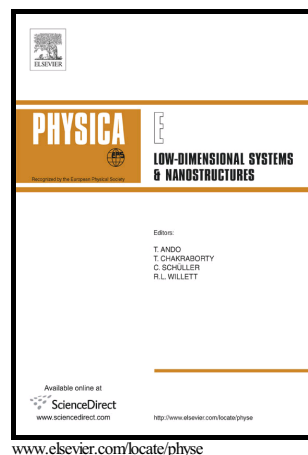


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# Ionic self-assembled porphyrin-graphene composite for enhanced photocurrent response and electrochemical property

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## Abstract

We have synthesized cationic mesa-tetra(4-pyridyl) porphine (TPyP)-reduced graphene oxide (RGO) hybrid structures through chemical reduction and subsequent ionic self-assembly. UV-vis spectroscopy, fluorescence emission spectroscopy and scanning and transmission electron microscopies are used to analyze the structures, which indicate that TPyP covalent bonds present between the double surface of RGO sheets. A reversible on/off photo-current density of  $45.89 \mu\text{A}/\text{cm}^2$  has been observed when the as-formed TPyP/RGO nanocomposite is placed in the environment of pulsed white-light illumination. In addition, an ultrasensitive electrochemical aptasensor could be fabricated by the as-prepared TPyP/RGO to detect thrombin. A linear response to thrombin has been observed with the as-formed electrochemical aptasensor in the concentration range of 1 to 1200 nM. Besides, the limitation of detection is determined to be 0.3 nM.

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