

High Performance Heterojunction Photocatalytic Membranes Formed by Embedment of Cu₂O and TiO₂ Nanowires in Reduced Graphene Oxide

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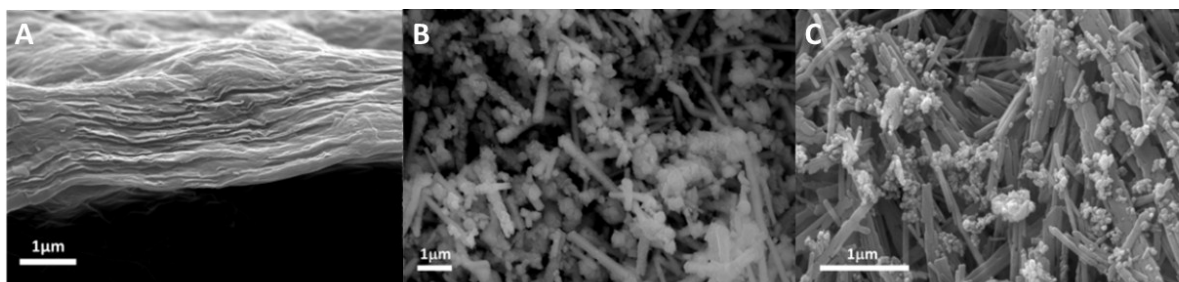


Fig. S1 FESEM images of (a) rGO membrane. (b) Cu₂O nanowires. (c) TiO₂ nanowires.

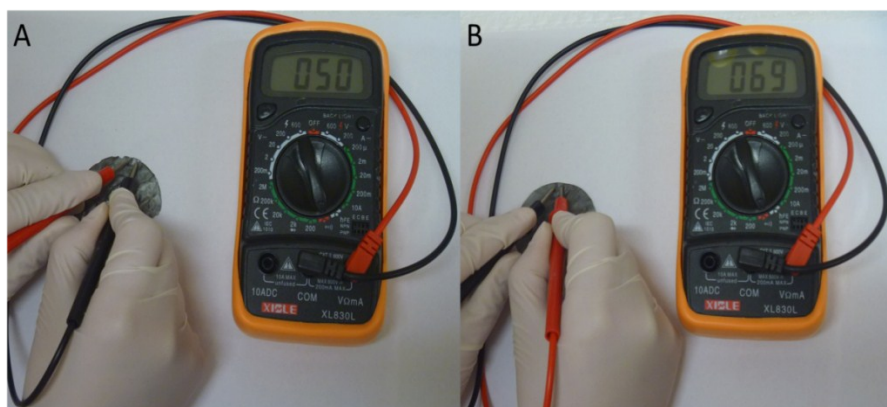


Fig. S2 The resistance of the rGO membrane (a) and rGO/Cu₂O/TiO₂ membrane (b).

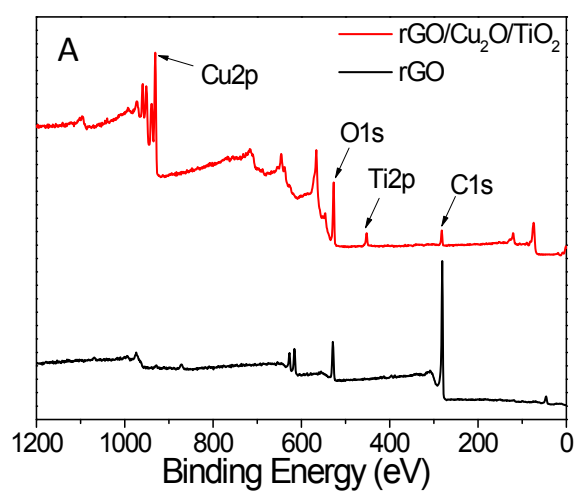


Fig S3. XPS survey spectrum of the rGO/Cu₂O/TiO₂ composite membranes.

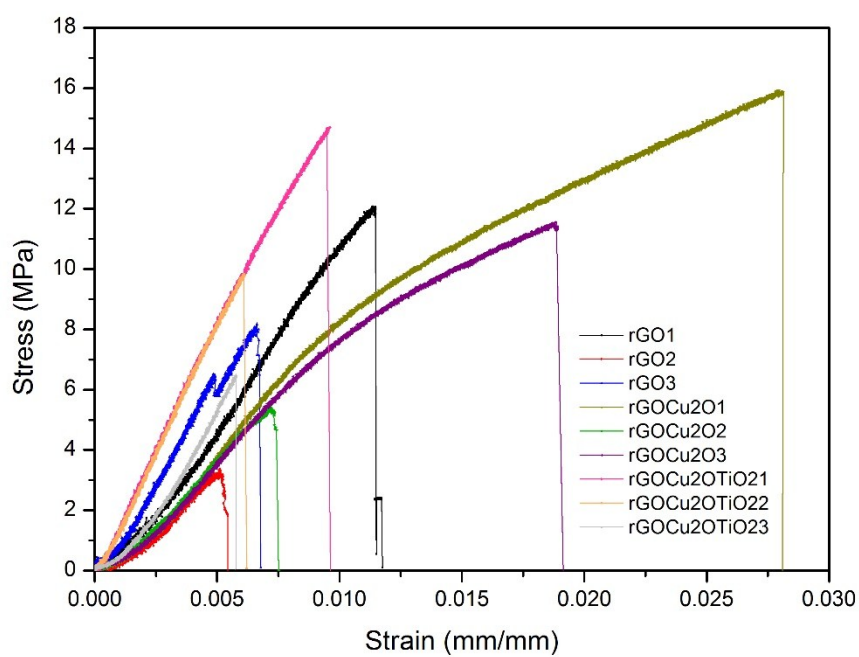


Fig S4. Tensile stress-strain tests.

Table S1. Tensile Young's Moduli of unary, binary and ternary rGO membranes.

Sample	Young's Modulus (E)
rGO 1	1117.67104
rGO 2	919.95378
rGO 3	1360.14432
rGO/Cu ₂ O 1	364.85664
rGO/Cu ₂ O 2	850.97092
rGO/Cu ₂ O 3	394.24711
rGO/Cu ₂ O/TiO ₂ 1	1360.96589
rGO/Cu ₂ O/TiO ₂ 2	1522.31699
rGO/Cu ₂ O/TiO ₂ 3	1508.80656

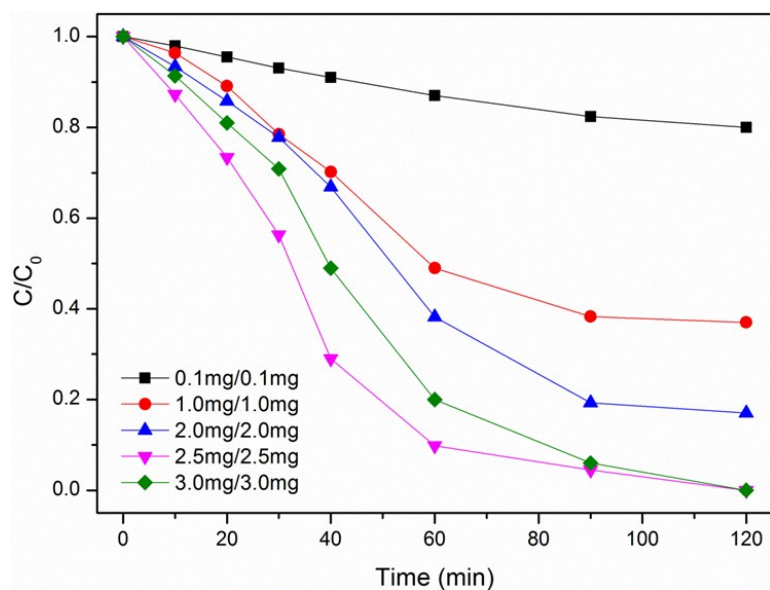


Fig. S5 The photocatalytic degradation of Methyl Orange by rGO/Cu₂O/TiO₂ composite membrane with different Cu₂O NWs/TiO₂ NWs loadings under UV-Vis light irradiation;

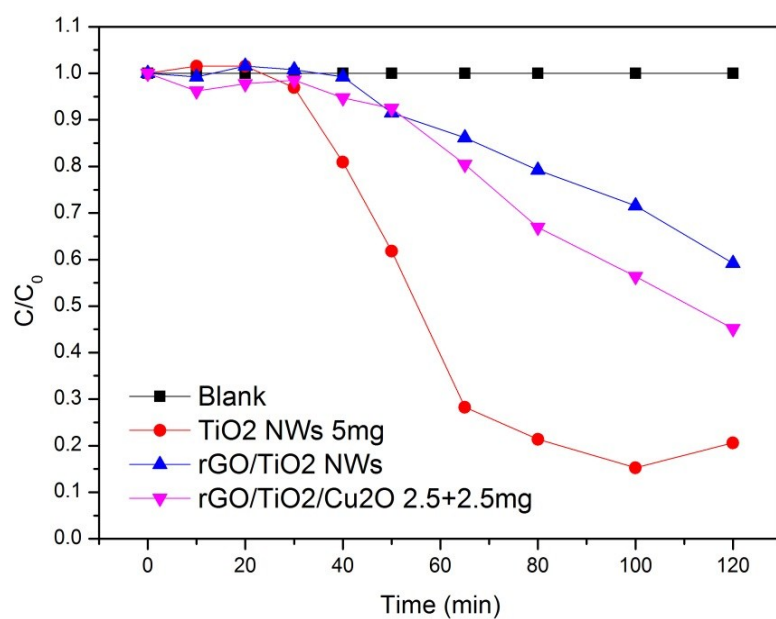


Fig. S6 The photocatalytic degradation of Benzoic Acid by rGO/Cu₂O/TiO₂ membrane under UV-Vis light irradiation;

Experimental details for the photocatalytic pathway study

The selection of Rhodamine B (RhB) as the model molecule in this study is due to its distinguishable UV-vis absorption peak relative to isopropanol and methanol. 40ml 10 ppm RhB solution was prepared and one piece of rGO/TiO₂/Cu₂O membrane was added into the solution, stirring at 300rpm in absence of light. Once the system has reached the adsorption-desorption equilibrium after 1 hour, the system started to expose to UV-Vis illumination. 0.1M isopropanol was added in order to quench •OH, 1 mL of RhB was sampled at certain time intervals and absorbance was measured by UV-Vis spectrometer to monitor the quenching effect. Same procedure was repeated however instead of using isopropanol, 0.1M methanol was employed to scavenge both h⁺ and •OH.