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Applications of carbon-based nanomaterials in electro-chemistry

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Abstract: Hear in, carbon-based materials, such as reduced graphene oxide (rGO) and graphitic carbon nitride (g-C3N4) were used to created composite materials for electrochemistry applications. Namely, superior thin g-C3N4 were created with different crystallinity was obtained via controlling the thermalcondensation processed. Crystalline and amorphous g-C3N4 revealed different photo- and electro-catalysis properties. With doping and adjusting the recrystalline process of precursors, various tubular morphologies. Such tubular g-C3N4 revealed superior photocatalysis performance for the degradation of dye in lake water.As for rGO composite, Z-scheme rGO/TiO2-bronze (TiO2-B)/W18O49 photocatalyst exhibits an excellent photocatalytic performance under full solar-spectrum irradiation. The result may represent a new strategy for the construction of nanocomposites with suitable band structure in the efficient application of full solar light. In addition, Hierarchical bimetallic Ni-Co phosphides hollow spheres were encapsulated in P-doped reduced graphene oxide (PrGO) to create superior electrochemistry performance. As a supercapacitor electrode, PrGO/NiCoP provides high discharge specific capacity to illuminate red-light light emitting diode, excellent rate performance and cycle stability. An asymmetric supercapacitor assembled with PrGO/NiCoP and activated carbon possesses an energy density of 49.7 Wh/Kg with power density of 0.366 KW/Kg. As an electrocatalyst, PrGO/NiCoP exhibits high hydrogen and oxygen evolution reaction activities in 1M KOH electrolyte. PrGO/NiCoPelectrolyzer shows excellent overall water splitting performance and durability, which requires a cell voltage of 1.56 V to achieve a current density of 10 mA cm−2.

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