Novel macroporous Pt/g-C_3N_4/$NiTiO_3$ photocatalyst for photocatalytic hydrogen production by water splitting

Dao Duc Quang, 웬티킴안[1], 장개명[1], 신은우[1,†]
University of Ulsan; [1]울산대학교
(ewshin@ulsan.ac.kr†)

Hydrogen evolution by photocatalytic water splitting under solar irradiation has been a promising technology capable of solving the worldwide energy and environmental crisis. In recent years, $NiTiO_3$ and graphitic carbon nitride (g-C_3N_4) have attracted great attention due to their capability to be activated under visible light irradiation. In this study, novel macroporous composite g-C_3N_4/$NiTiO_3$ (Ma-CNT) was prepared from graphitic carbon nitride nanosheets (which were synthesized by a two-step process, urea calcination in air followed by argon treatment) and macroporous $NiTiO_3$ using Polystyrene as the polymer template. By depositing platinum as a cocatalyst via a photodeposition method, this composite demonstrated higher photocatalytic activity compared to common graphitic carbon nitride or pure $NiTiO_3$. This superb photocatalytic activity could be attributed to large specific surface area and lower charge recombination owing to some defects being introduced by the gas treatment and the influence of introduced macropores. This Ma-CNT photocatalyst was characterized by XRD, SEM, TEM, EIS, UV-vis and N_2 sorption.