Synergistic effect of chemical and structural defects of graphitic carbon nitride for enhanced photocatalytic hydrogen evolution rate

Nguyen Phuong Anh, 웬티킴안, Dao Duc Quang, 왕명연, 김상윤, 신은우†
울산대학교
(ewshin@ulsan.ac.kr†)

Graphitic carbon nitride (g-C3N4) has attracted enormous interests in the research area of hydrogen evolution reaction (HER) due to its non-toxicity, low cost, stable performance as well as easy preparation. However, bulk g-C3N4 remained disadvantages such as rapid charge-carrier recombination rate and low specific surface area. In this study, exfoliated g-C3N4 photocatalysts have been prepared by a simple and environmental-friendly method of ethanol solvothermal treatment. The presence of oxygen-containing functional groups and morphology structure was optimized by varying the temperature and time. Especially, exfoliated Pt/CN-160-6 (160 °C, 6 h) photocatalyst exhibited the highest photocatalytic activity among all samples. In this condition, optimized-oxygen-containing groups could act as electron transport channels to restrain electron-hole recombination, while narrower interlayer distance improved the photogenerated electron transfer ability between adjacent heptazine layers.