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TITANIA ASSISTED METAL ORGANIC FRAMEWORK MATRIX FOR ELEVATED HYDROGEN GENERATION COMBINED WITH THE PRODUCTION OF GRAPHENE SHEETS THROUGH WATER SPLITTING PROCESS

Heba M Gobara[1], Ahmed M A El-Naggar, Rasha S Mohamed and Amal A Alkahlawy

Egyptian Petroleum Research Institute, Egypt

In this study, metal organic framework (Cr-MIL-101) and TiO_2 nanoparticles were utilized as two semiconductors for water splitting process. The coupling of both semiconductors in order to improve the photocatalytic reactivity for the hydrogen production in presence of methanol as a hole scavenger under visible light (sunlight) has been performed. The aforementioned semiconductors and the collected samples after water splitting application are characterized by several techniques viz., XRD, N_2 adsorption-desorption, TEM, ED, EDX, Raman spectroscopy and total content of carbon. The results revealed an efficient yield of H_2 production with maximum purity 99.3% with *in situ* formation of graphene oxide nanosheets and multi-walled carbon nanotubes coated over the surface of the physically mixed Cr-MIL-101-TiO_2 system. The amount of H_2 gas produced was stored when using Cr-MIL-101 catalyst individually. The obtained data in this work provides a promising candidate material for pure hydrogen poduction as a clean fuel acquired from the water splitting process. In addition, the in situ production of graphene nanosheets and carbon nanotubes is counted as promising advances for the presented process.

hebagobara@ymail.com