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Photo-catalytic hydrogen production via water splitting using ordered mesoporous catalysts

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SBA-15 material with well-ordered hexagonal arrays mesoporous was prepared by hydrothermal method. Modification of SBA-15 was carried out by using aluminum oxide with different ratios of 10, 25 and 40 wt.% which achieved via direct and post syntheses. Sonication and conventional impregnation methods were used for preparation Al/SBA-15 using post synthesis technique. Loading of iron oxide to Al-SBA-15 were adopted to increase the acid metal sites for production of hydrogen. The physicochemical characteristics viz., XRD, N₂ adsorption-desorption, TGA/DSC, FT-IR, TEM and Raman spectroscopy techniques were investigated. The obtained results for 25% aluminum oxide ratio are promising. The results surface area measurements indicated that both specific surface area and the total pore volume of SBA-15 was enhanced; 800 m²/g and 1.12 cm³/g, respectively, compared with other methods illustrated in literature due to using the new trend of hydrothermal techniques. Also, 25% of Al to SBA-15 has high surface area 880 m²/g and total pore volume 1.022 cm³/g. The efficient yields are H₂ production with maximum purity 77.3% and 12.7% of hydrocarbons (methane, ethylene, propane and iso-butane) with Al-SBA-15 by direct method and when loading of Fe by ultrasonic method production of 100% 2-pentene.

Biography

Rasha El-Sayed Mohamed has completed her PhD in 2015 from Ain Shams University, Egypt. She has published five papers in reputed journals. She has been working in preparation of nano-catalysts, silica, alumina and metal-organic frameworks.

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