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Pt/gCN loaded hydrogel films as a H2 production device

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Photocatalysis of water is becoming one of the pillars of green approaches to obtain sustainable energy supply. The water splitting reaction is an easy way to implement the sun to produce hydrogen-based energy. Pt loaded graphitic carbon nitride (g-CN) has been found as a promising candidate for the H2 evolution reaction under visible light. It showed a high H2 evolution efficiency in aqueous solution despite the photocatalyst spreading in solution. Previous works proposed to introduce hydrogels as host matrix and water storage for the water splitting reaction. This work aims to develop this system in a polymer thin film configuration to make it suitable for industrial purposes. Poly(N-isopropylacrylamide) (PNIPAM) thin films exhibit good swelling capacity in water vapor atmosphere and appear suitable for a hybrid thin film system. A new isomer poly(N-vinylisobutyramide) (PNVIBAM) has also been proposed due to its higher lower critical solution temperature (LCST) in aqueous solution (≈39°C), which makes it more stable in ambient environment. Therefore, an initial comparison of both polymers is based on in situ spectral reflectance and FT-IR measurements. The hybrid thin films have been spray coated to proceed grazing incident small angle x-ray scattering (GISAXS). G-CN/Pt blended polymer films microstructure is analysed under light irradiation conditions and future neutron reflectivity experiments will provide information about the water distribution in the hybrid layers.

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