SYNTHESIS, CHARACTERIZATION, AND APPLICATION OF POLYVINYLPYRROLIDONE (PVP)/MnFe COMPOSITE FOR WATER SPLITTING

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Electrochemical water splitting is one of the best methods for producing hydrogen and oxygen on an industrial scale, but the high cost and unavailability of noble metals on a commercial level limit its application for hydrogen and oxygen evolution reactions (HER and OER). Developing cost-effective and efficient non-noble metal-based electrocatalysts for HER and OER is challenging. In this work, the hydrothermal synthesis method has been employed for the preparation of the PVP/MnFe composite. The surface morphology, structure, and composition of the PVP/MnFe composite have been characterized using scanning electron microscopy (SEM), X-ray diffraction (XRD), and inductively coupled plasma optical emission spectroscopy (ICP-OES). The activity of PVP/MnFe nanocomposite has been investigated for HER and OER in 1 M KOH solution by recoding linear sweep voltammograms (LSVs) at a scan rate of 2 mV s^{-1}. It was found that the synthesized PVP/MnFe composite contained 14 wt.% of Mn and 86 wt.% of Fe and exhibited an onset potential of -0.14 V for HER and 1.53 V for OER, indicating a good activity for both reactions.