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Abstract

The principal focus of this investigation is to prepare the $SrMnO_3$ nanostructures by different chemical methods such as ultrasonic, co-precipitation, microwave, and hydrothermal methods. The influence of calcination temperature, and ultrasound irradiation power, and the presence of surfactant investigated on morphology and size of $SrMnO_3$ nanostructures. As-prepared nanoparticles were characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FT-IR), X-ray energy dispersive spectroscopy (EDS) and ultraviolet-visible (UV–Vis) spectroscopy. The results indicated that by changing in method and reaction condition, product appeared in different size, morphology, and uniformity. The morphology and size of nanostructures have been influenced on the properties of nano-$SrMnO_3$. For investigation of properties, the $SrMnO_3$ was used in catalytic water splitting for O_2 evolution in presence of $(NH_4)_2Ce(NO_3)_6$. The effect of nano-catalysts and the concentration of $(NH_4)_2Ce(NO_3)_6$ have been studied on O_2 evolution reaction. Results show that the efficiency of water splitting increased by enhancement in the size and uniformity of catalysts and introduced the $SrMnO_3$ as a new and efficient catalyst for O_2 evolution reaction.

Key words: Nanostructures; Chemical synthesis; Catalytic properties; Water splitting; O_2 evolution reaction.