Short Communication

Hierarchical Core-shell $\text{SnO}_2/\text{Ag}/\text{Co}(\text{OH})_2$ Spheres Comprising Wrinkled Nanosheets for Highly Efficient Oxygen Evolution Reaction

Xin-Yu Zhang¹, Jing-Qi Chi², Zi-Zhang Liu¹, Bin Dong^{1,2,*}, Yan-Ru Liu², Kai-Li Yan², Wen-Kun Gao^{1,2}, Yong-Ming Chai², Chen-Guang Liu²

¹ College of Science, China University of Petroleum (East China), Qingdao 266580, PR China

² State Key Laboratory of Heavy Oil Processing, China University of Petroleum (East China), Qingdao 266580, PR China

*E-mail: dongbin@upc.edu.cn

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Hierarchical core-shell $\text{SnO}_2/\text{Ag}/\text{Co}(\text{OH})_2$ spheres have been synthesized for efficient oxygen evolution reaction (OER) in alkaline solution using Ag-modified SnO_2 hollow spheres (SnO_2/Ag) as support. SnO_2/Ag hollow spheres can provide not only large surface area for the growth of $\text{Co}(\text{OH})_2$ but also better conductivity and stability derived from Ag. XRD shows the formation of amorphous $\text{Co}(\text{OH})_2$ supported on SnO_2/Ag . XPS confirms the existence and valence state of Sn, Ag and Co. EDX and SEM elemental mapping show the composition and good distribution of Sn, O, Ag and Co. SEM and TEM show that the wrinkled $\text{Co}(\text{OH})_2$ nanosheets homogeneously covered on the surface of SnO_2/Ag hollow spheres, which implying more exposed active sites. OER measurements show that $\text{SnO}_2/\text{Ag}/\text{Co}(\text{OH})_2$ has the enhanced performances with lower onset potential (1.4 V vs. RHE), smaller Tafel slope (80.04 mV dec^{-1}) than $\text{SnO}_2/\text{Co}(\text{OH})_2$ and unsupported $\text{Co}(\text{OH})_2$. Ag modification may be the key for enhancement performances for OER due to providing faster electron transfer rate. The excellent long-time stability of $\text{SnO}_2/\text{Ag}/\text{Co}(\text{OH})_2$ may be ascribed to the close combination between $\text{Co}(\text{OH})_2$ and SnO_2/Ag and stability of Ag in alkaline solution. The suitable support with good dispersion and conductivity can provide a facile way to prepare effective electrocatalysts for OER.

Keywords: SnO_2 ; Ag modification; $\text{Co}(\text{OH})_2$; electrocatalyst; oxygen evolution reaction

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