Preparation of Nano-Ag$_4$Bi$_2$O$_5$ with Co-precipitation Method and Study of Its Application for Oxygen Reduction Reaction

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Nano Ag$_4$Bi$_2$O$_5$ rods were synthesized by co-precipitation method, in which mixed AgNO$_3$- Bi(NO$_3$)$_3$ solution was used as Ag-Bi source and KOH solution as precipitant. The structure, morphology and composition were researched via powder X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS) and scanning electron microscope (SEM), etc. Results show that the Ag$_4$Bi$_2$O$_5$ were nanorods crystal with 20-30 nm in width and 200-300 nm in length. Electrochemical measurements indicate that the Ag$_4$Bi$_2$O$_5$ has excellent performance for oxygen reduction reaction (ORR) followed a four-electron transfer pathway in alkaline electrolyte. Moreover, Ag$_4$Bi$_2$O$_5$ was further tested in an assembled zinc-oxygen (Zn-O$_2$) battery, which discharged up to 1400 h at 10 mA cm$^{-2}$. So essentially, the inexpensive and available Ag$_4$Bi$_2$O$_5$ electrocatalyst has superior electro-catalytic activity and good durability.

Keywords: Co-Precipitation; Ag$_4$Bi$_2$O$_5$; Electrocatalysis

FULL TEXT

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