

Electrochemical preparation of nanostructured Ba.PbO₂ electrode for oxidation of ammonia in alkaline solution

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Lead dioxide electrodes are still industrially important and cheap electrodes for energy storage and delivery applications. But, controlling the dissolution of positive lead dioxide is a challenging factor to increase its life time. To overcome this problem, many metal ions are incorporated along with PbO₂. In this way group IIA metals are considered as significant dopants to stabilize the positive PbO₂ material. Thus, Pb-Ca, Pb-Ba, and Pb-Sr-Ba alloys are commercially available for the real application. Among them, Ba metal has shown enhanced electrode hardness and stability. Herein, the Ba.PbO₂ electrode was electrochemically prepared and utilized as NH₃ sensor. At first, current density and concentration of precursor of Barium and Lead were varied, concentration ratio between Pb to Ba was also considered. All the electro-depositions were carried out at 65 °C in 0.2 M H₃BO₃. The as prepared electrodes examined through SEM and XRD analyses. Further, the prepared electrode was subjected to determination NH₃ through cyclic voltammetry technique in various pH solutions.