

Synthesis and Performance Study of Co₃O₄ as a Bi-Functional Next Generation Material

Authors : Shrikaant Kulkarni, Akshata Naik Nimbalkar

Abstract : In this work a method protocol has been developed for the synthesis of innovative Co₃O₄ material by using a method of chemical synthesis followed by calcination. The effect of calcination temperature on the morphology, structure and catalytic performance on material in question is investigated by using characterization tools like scanning electron microscopy (SEM), X-ray diffraction (XRD) spectroscopy and electrochemical techniques. The SEM images reveal that the morphology of the Co₃O₄ material undergoes a change from the rod to a beadlike shape on calcination at temperature of 700 °C. The XRD image shows that although the morphology of synthesized Co₃O₄ material exhibits a cubic phase but it differs in crystallinity depending upon morphology. Similarly spherical beadlike Co₃O₄ material has exhibited better activity than its rodlike counterpart which is reflected from electrochemical findings. Further, its performance in terms of bifunctional nature and holds a lot much of promise as an excellent electrode material in the next generation batteries and fuel cells.

Keywords : bifunctional, next generation material, Co₃O₄, XRD

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