

Structural and dielectric characterization of Nickel-Cobalt oxide nanocomposite

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Nanostructured metal oxides are found to be interesting for their remarkable properties in electronic, magnetic, optical, thermal and mechanical fields. Fabrication of composite structures and devices with materials capable of enhancing the properties of the component materials. This can be done either by utilizing the size advantage through templating on the nanomaterials or by enhancing the properties to drive new synergetic properties of the two combined materials. In the present work we have prepared nickel-cobalt oxide nanocomposite using well known co-precipitation method. For comparison we have also prepared nano nickel oxide and nano cobalt oxide. The samples were characterized using TG, SEM, EDAX, FTIR and XRD. The SEM image of the nanocomposite was entirely different from the images of individual metal oxides. From EDAX and FTIR the formation of the composite was confirmed. The XRD on comparison with the composite and the individual oxides clearly indicate that the all the samples are formed in cubic system with FCC lattice. Scherrer equation, the simplest method of determining the average size of nanocrystalline samples from X – ray diffraction line broadening was used to find the particle size and the size was in the range of 20-25 nm. The AC conductivity studies at various frequencies of nickel-cobalt oxide nanocomposite in the frequency range 100Hz to 13MHz was carried out. The results showed that the capacitance of the as prepared nanocomposite varied from milli farad to pico farad range. The conductivity also showed the corresponding variation. From the AC conductivity study it is concluded that the present material on proper tuning can be used as a super capacitor. Further studies in this direction are in progress.

Biography

R. Raveendran, Associate Professor in Physics has completed his Ph.D from M.S. University of Baroda , Vadodara, India and also completed his Post doctoral studies with financial support of UGC , NewDelhi. He is a recognized research guide of Kerala University. He has published more than 25 papers in reputed journals and attended and presented research papers in more than fifty seminars / conferences in and out of the country. He has produced four Ph.D's and completed many research projects.

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