Impedance, Electrical and Dielectric behaviour of Tin Oxide Nanoparticle doped with Graphite, Graphene Oxide and Reduced Graphene Oxide

Benny Sebastian^{1,2,*}, C. George Thomas² and B. Manoj²

¹ Bharathiar University, Coimbatore, INDIA

² Department of Physics and Electronics, CHRIST University, Bengaluru, INDIA

*E-mail: benny.sebastian@christuniversity.in

doi: 10.20964/2021.08.17

Received: 29 March 2021 / Accepted: 23 May 2021 / Published: 30 June 2021

Nanostructured materials have attained incredible interest in recent days due to their distinctive chemical, physical, mechanical, magnetic and optoelectronic properties. In the present study, metal nano particle (SnO_2) was doped with graphite, graphene oxide (GO) and reduced graphene oxide (rGO) with various composition (1:100), (1:1) and (100:1) by weight ratio. The citrate-nitrate gel combustion method was used to prepare nanocrystalline SnO_2 while GO and rGO were synthesized through modified Hummer's method. The preparation of SnO_2 -rGO composites was done using a one-step hydrothermal process. The electrical and structural behaviour of the composites of graphite, GO and rGO mixed with SnO_2 were elucidated by the impedance analyzer in the frequency range from 10Hz to 1MHz. It is observed that the composite of SnO_2 with graphite and reduced graphene oxide have similar broad characteristics while SnO_2 mixed with GO is exhibiting different properties which could be attributed to the presence of oxygen functionaries.

Keywords: Nanocomposites, Graphene oxide, Reduced graphene oxide, Tin oxide.

[FULL TEXT](#)

© 2021 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).