Accepted Manuscript

Title: Dielectric relaxation of gamma irradiated muscovite mica

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PII: S0025-5408(14)00715-6
DOI: http://dx.doi.org/doi:10.1016/j.materresbull.2014.11.034
Reference: MRB 7846

To appear in: *MRB*

Received date: 16-5-2014
Revised date: 15-10-2014
Accepted date: 14-11-2014

Please cite this article as: Navjeet Kaur, Mohan Singh, Lakhwant Singh, A.M.Awasthi, S.P.Lochab, Dielectric relaxation of gamma irradiated muscovite mica, Materials Research Bulletin http://dx.doi.org/10.1016/j.materresbull.2014.11.034

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ACCEPTED MANUSCRIPT

Dielectric relaxation of gamma irradiated muscovite mica

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Graphical abstract

Highlights

- The present article reports the effect of gamma irradiation on the dielectric relaxation characteristics of muscovite mica.
- Dielectric and electrical relaxations have been analyzed in the framework of dielectric permittivity, electric modulus and Cole-Cole formalisms.
- The frequency dependent electrical conductivity has been rationalized using Johnsher's universal power law.
- The experimentally measured electric modulus and conductivity data have been fitted using Havriliak–Negami dielectric relaxation function.

Abstract

In the present research, the dielectric relaxation of gamma irradiated muscovite mica was studied in the frequency range of 0.1 Hz to 10 MHz and temperature range of 653K to 853K, using the dielectric permittivity, electric modulus and conductivity formalisms. The dielectric constants (ε' and ε'') are found to be high for gamma irradiated muscovite mica as compared to the pristine sample. The frequency dependence of the imaginary part of complex electric modulus (M'') and *dc* conductivity data conforms Arrhenius law with single value of activation energy for pristine sample and two values of activation energy for gamma irradiated mica sample. The experimentally assessed electric modulus and conductivity

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