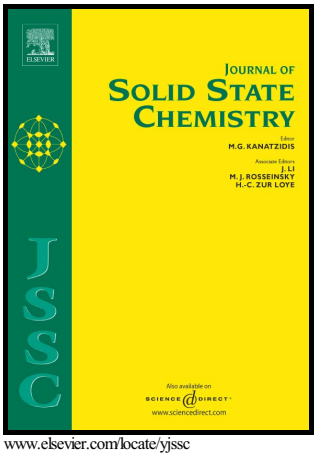

www.elsevier.com/locate/yjssc

Electrical characterization, phase transition and vibrational spectroscopic investigations of a new organic-inorganic material $(C_7H_{10}NO)SnCl_3$

Sahel Karoui, Hassen Chouaib, Slaheddine Kamoun

PII: S0022-4596(17)30276-1
DOI: http://dx.doi.org/10.1016/j.jssc.2017.07.016
Reference: YJSSC19866

To appear in: *Journal of Solid State Chemistry*

Received date: 25 May 2017
Revised date: 29 June 2017
Accepted date: 11 July 2017

Cite this article as: Sahel Karoui, Hassen Chouaib and Slaheddine Kamour Electrical characterization, phase transition and vibrational spectroscopi investigations of a new organic-inorganic material $(C_7H_{10}NO)SnCl_3$, *Journal o Solid State Chemistry,* http://dx.doi.org/10.1016/j.jssc.2017.07.016

Electrical characterization, phase transition and vibrational spectroscopic investigations of a new organic-inorganic material $(C_7H_{10}NO)SnCl_3$

Sahel Karoui[1*], Hassen Chouaib[1] and Slaheddine Kamoun[1]

(1) Laboratory of Material Engineering and Environment (LR11ES46), National School of Engineering, Box 1173, 3038, Sfax, Tunisia.

*Corresponding author: E-mail address: karouisahel@yahoo.fr

Tel: +216 99 090 678

Fax: +216 74 669 330

Keywords: Thermal analysis; NMR spectroscopy; IR and Raman spectra; Impedance analysis; AC conductivities.

ABSTRACT

The X-ray powder analysis, thermogravimetric analysis, differential scanning calorimetry analysis, solid CP-MAS ^{13}C NMR characterization, vibrational spectroscopy and complex impedance spectroscopic data have been carried out on $(C_7H_{10}NO)SnCl_3$ compound. The results show that this compound exhibits a phase transition at 314K which was characterized by ^{1}HNMR between 298 and 336 K, differential scanning calorimetry (DSC), X-rays powder diffraction, Raman spectroscopy and dielectric measurements. The temperature dependence of the ^{1}HNMR spectrum for $(C_7H_{10}NO)SnCl_3$ could be explained by invoking reorientation of ammonium group of the 2-methoxyanilinium cation. The most important changes are observed for two lines at 3087cm^{-1} and 3175cm^{-1} (at room temperature) issued from asymmetric and symmetric stretching vibrations of $\nu_{s(NH3)}$ and $\nu_{as(NH3)}$ band, respectively. AC and DC conductivities, complex dielectric permittivity $\varepsilon^*(\omega)$ and complex electrical modulus $M^*(\omega)$ were respectively studied as temperature and frequency functions. Moreover, the temperature dependence of the DC conductivity and relaxation frequency followed the Arrhenius relation. The frequency dependence of the real part of the AC conductivity in both phases follows the Jonscher's universal dynamic law: $\sigma_{Tot.}(\omega,T)=\sigma_{DC}(T)+B(T)\ \omega^{S(T)}$. The close values of activation energies, obtained from the thermal behavior of the conductivity and the relaxation time confirm that the transport is through ion-hopping mechanism.