ABSTRACTS

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NMR LINESHAPES IN SOLIDS WITH MOLECULAR MOBILITY

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The problem of the NMR lineshapes or free induction decays (FID) in solids with molecular mobility is well known although still unsolved [1-3]. At present time a variety of approaches have been proposed in order to resolve this problem. One from these approaches is the moment method proposed in the papers [4,5]. In this method the shape of FID $G(t)$ is approximated by a Taylor series

$$G(t) = \sum_{n=0}^{\infty} \frac{(it)^n}{n!} a_n \ . \qquad (1)$$

In the rigid lattices the coefficients a_n are coincided with the Van-Vleck's moments [6]. In the solids with molecular mobility the first coefficients a_n can be also easily calculated [4,5,7]

$$a_0 = 1 \ , \quad a_1 = 0 \ , \quad a_2 = M_2 \ , \quad a_3 = i\frac{\Delta M_2}{\tau_c} \ , \quad a_4 = M_4 - \frac{\Delta M_2}{\tau_c^2} \ . \qquad (2)$$

The other approach has been proposed in [8,9]. In this approach the NMR lineshape $f(\Delta\omega)$ is represented in the form of an infinite fraction

$$f(\Delta\omega) = \mathrm{Re}\frac{1}{i\Delta\omega - i\omega_0 + \cfrac{\nu_0^2}{i\Delta\omega - i\omega_1 + \cfrac{\nu_1^2}{i\Delta\omega - i\omega_2 + \cfrac{\nu_2^2}{\ddots}}}} \ . \qquad (3)$$

The coefficients ν_n^2 and ω_n are connected with coefficients a_n [8,9]. In the case of rigid lattice it follows from Eq.(3) the well known result [10]. In this report the different approximations to the calculation of the infinite fraction (3) will be discussed. The obtained results will be compared with known and obtained experimental results.

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