**Study of phase transition in order-disorder ferroelectric Rochelle salt crystal**

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**1. Introduction**

In considering the cubic and quartic-order phonon anharmonic interaction terms, extra spin-lattice interactions, direct spin-spin interaction and electric field terms into a modified two sublattice pseudospin lattice couple mode model Hamiltonian [1] to study ferroelectric Rochelle salt (RS) crystal. The expressions for soft mode frequency, dielectric constant and loss tangent have been derived. The two sublattice model Hamiltonian, retarded Green function method [2] and treatment of Dyson’s equation have been used in the development of these properties. By fitted the model parameters of various physical quantities in the obtained expressions, the thermal dependence of soft mode frequency, dielectric constant and loss tangent evaluated for hydrogen-bonded RS crystal. Theoretical results are in good agreement with experimental data of others. It is shown that cubic and quartic phonon anharmonic couplings and extra spin interactions render real value to the soft mode frequency in the para-phase.

**2. References**

[1] B.K. Chaudhuri, T. Atake, S. Ganguli & H. Chihara, *Journal of Physical Society of Japan*, **49** (1980) 608.

[2] D.N. Zubarev, *Soviet Physics Uspekhi*, **3** (1960) 320.