**Fermi Resonance in Phonon Spectra of Quaternary Chalcohenides of the type Cu2ZnGeS4**

**Valakh M. Ya .(Foreign) 1**

**Litvinchuk A. P. (Foreign) 2**

**V. M. Dzhagan (Foreign) 3**

**Yukhymchuk V. O. (Foreign) 4**

**Yaremko A. M. (Foreign) 5**

**Yu. A. Romanyuk (Foreign) 6**

**Guc M. (Foreign) 7**

**Bodnar I. V. 8**

**Pérez-Rodríguez A. (Foreign) 9**

**D. R. T. Zahn (Foreign) 10**

8 Belarusian State University of Informatics and Radioelectronics

**Abstract.** The experimental resonant and non-resonant Raman scattering spectra of the kesterite structural modification of Cu2ZnGeS4 single crystals are reported. The results are compared with those calculated theoretically within the density functional perturbation theory. For the majority of lines a good agreement (within 2–5 cm−1) is established between experimental and calculated mode frequencies. However, several dominant spectral lines, in particular the two intense fully symmetric modes, are found to deviate from the calculated values by as much as 20 cm−1. A possible reason for this discrepancy is found to be associated with the Fermi resonant interaction between one and two-phonon vibrational excitations. The modelling of spectra, which takes into account the symmetry of interacting states, allows a qualitative description of the observed experimental findings. Due to the similarity of the vibrational spectra of Cu2A II B IV S4 (A  =  Zn, Mn, Cd; B  =  Sn, Ge, Si) chalcogenides, Fermi resonance is argued to be a general phenomenon for this class of compounds.

**Keywords:** Cu2ZnGeS4, kesterite, Raman scattering spectra, Fermi resonance.

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