Contribution of the Jahn-Teller sub-system to the dynamic moduli via simulation of relaxation time

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Contribution of the Jahn-Teller sub-system to the complex elastic moduli with the use of three mechanisms of relaxation is proved to be an exclusive method for investigation of the Jahn-Teller effect manifestation in substituted crystals when the barriers of the adiabatic potential energy surface are pretty small (about 100 cm^{-1} or lower) and consequently the relaxation peak of attenuation is observed at the temperatures below 20 K. Investigating the CaF_2:Cr^{2+} [1], we have shown that three mexhanisms of relaxation discussed in [2], namely, thermal activation and two thermal-phonon assisted mechanisms can be used perfectly well for simulation the temperature dependence of ultrasonic attenuation and subsequent calculation of the vibronic coupling constants and the stabilization energies. Here we present the result of application of such a methodology to the experimental data obtained on another crystal, BaF_2:Cu^{2+}. The financial support by the Ministry of Science and Higher Education of the Russian Federation (basic part of the government mandate, Project No. FEUZ-2023-0013) is acknowledged.

[1] Sarychev M N, Bondarevskaya A S, Zhevstovskikh I V, Ulanov V A, Shakurov G S, Egranov A V, Surikov V T, Averkiev N S and Gudkov V V 2021 *JETP Letters* **113** 47–51

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