LOW-TEMPERATURE ELECTRON SPECTRA OF IMPURITIES IN NAPHTALENE CRYSTALS

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S u m m a r y

This work relates to the study of vibrational structures in the electron spectra of naphthalene crystals with impurities of β- and α-naphthalene fluorine with concentrations of 10^{-4} to 10 wt.% at a temperature at 4.2 K. It is determined that, at low impurity concentrations, the spectra have a doublet structure and consist of narrow quasilines with initial values of $\nu_{01} = 31322$ cm^{-1} and $\nu_{02} = 31226$ cm^{-1}, which are resonance-coincident in the absorption and fluorescence spectra. It is demonstrated that if the impurity concentration increases, the series of narrow quasilines appear in the areas of the 0-0 transitions of the impurity centers of both types together with the doublet structure. A part of these quasilines is polarized predominantly along the b-axis of a naphthalene crystal. The model is proposed for impurity centers, which induce the generation of new spectral bands. This model is based on the interaction of translation-nonequivalent impurity molecules in the elementary lattice cell of a naphthalene crystal. At high impurity concentrations, the resonance-symmetric wide spectral bands appear in the absorption and fluorescence spectra. The analysis of the results obtained is performed with consideration for the Franck–Condon interaction and the Herzberg–Teller interaction.