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Exciton-phonon effects in the spectra of microcavity polaritons

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The coupling of Frenkel excitons (FEs) and intramolecular vibrations in an organic layer as a part of microcavity has been studied in the paper. Two cases are treated: a) uniaxial layer of point group 4 (optical axis is supposed perpendicular to the layer); b) monoclinic anthracene-like layer with monoclinic axis b perpendicular to the layer. The exciton-phonon coupling produces the vibronic wings with complex spectra which can contain bound exciton-phonon states and many-particle (unbound) bands. Consequently in those regions the absorption lines and the resonance members in dielectric tensor appear. We treat theoretically their effects on the polaritons in the microcavity and illustrate using numerical calculations the peculiarities of the polaritonic spectra in the vibronic wings of Frenkel excitons.

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