INTERLAYER EXCITONS: EXPERIMENT AND THEORY

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S u m m a r y

Optical properties of 2H-PbI_2 single crystals intercalated by hydrazine molecules (N_2H_4) have been studied. Significant (more than 30 times) amplification of the polariton emission from the upper polariton branch with following quenching under increasing the concentration of hydrazine molecules in interlayer spaces has been found out. That is caused by the transitions of polaritons of the lower branch into polaritons of the upper branch by scattering at hydrazine molecule inclusions. The highly stable polytype transition 2H-4H has been registered which is caused by the formation of "covalent bridges" by interlayer hydrazine molecules with the neighbouring layer sandwiches. The new type of excitons — so-called interlayer excitons (the excitons localized in the interlayer space at incorporated molecules (atoms)) has been found which cause the appearance of a new doublet (4928 Å, 4934 Å) in the photoluminescence spectra between the exciton lines $n = 1$ and $n = 2$. A simple model for interlayer excitons was considered which takes into account the peculiarities of chemical bonding and polytype properties of such single crystals as 2H-PbI_2.