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Effect of magnetic polaron for acceptor bound exciton in CdTe:Dy crystals PETRO BUKIVSKIJ, YURIY GNATENKO, ANATOLII BUKIVSKII, Institute of Physics of National Academy of Sciences of Ukraine, ROMAN GAMERNYK, Lviv National University — We investigated low temperature ($T = 4.2$ K) photoluminescence (PL) spectra and temperature dependence ($T = 1.8 - 40$ K) of excitonic PL for CdTe doped by dysprosium. Dysprosium concentration was 10^{20} cm^{-3} . We detected the effect of magnetic polaron for acceptor bound excitons. Theoretical analysis of temperature dependency of emission energy of these excitons was performed. The calculations based on Spalek-Deitl-Kossut theory gave us an opportunity to estimate the magnetic polaron energy ε_p and its temperature dependence $\varepsilon_p(T)$ in $T = 1.8$ to 40 K temperature range. In addition, we calculated the temperature dependence of contributions of mean exchange field and thermodynamic fluctuations of magnetization to the spin splitting value Δ . Also, we calculated the temperature dependence of probability distribution function $P(\Delta, T)$ of the spin splitting value for acceptor bound excitons. It was found that calculated total contributions of mean exchange field and thermodynamic fluctuations of magnetization to spin splitting value is in good agreement with experimental data.

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