TEMPERATURE DEPENDENCE OF THE RADIATIVE LIFETIME OF J-AGGREGATES WITH DAVYDOV SPLITTING OF THE EXCITATION BAND


The temperature dependence of the radiative exciton lifetime ($\tau_{rad}$) of J-aggregates of 3,3'-bis(sulfopropyl)-5,5'-dichloro-9-ethylthiacarbocyanine (THIATS) characterized by a Davydov splitting of the exciton band has been determined over the temperature range from 4.2 to 130K. The Davydov splitting of the exciton was taken into account during the calculation of the coherent length ($N_C$) from the values of ($\tau_{rad}$). The dependence of ($\tau_{rad}$) on temperature was analyzed. The $\tau_{rad}$ (T) of J-aggregates of THIATS can be rationalized within the framework of a 1-D excitation model.