# Annotation

Uranyl ion $UO_2^{2+}$ and its complexes are the most common species of uranium(VI) in aqueous solutions. These objects are investigated by a number of research groups because of their practical importance. They are as a result of leakage from nuclear disposals to ground waters and in the process of miningincluding the uranium dissolution from ore material.

Monitoring of these technological processes is carried out by means of time-resolved laser-induced fluorescence spectroscopy (TRLIFS). TRLIFS allows for uranyl detection at low (nM) concentrations and to investigation the U(VI) complex coordination. However, the use of TRLIFS is complicated due to the dependence of the observed photophysical parameters of uranyl on the experimental conditions.

Namely, we showed that the profile of the kinetics of luminescence decay depends on the excitation intensity. The effect was described in this work by a model of bimolecular deactivation (annihilation) of an excited state caused by diffusion-limited interaction of excited ions.

Experimental study of the dependence of the annihilation rate on (i) concentration of uranyl in an aqueous solution, (ii) the parameters of the solution (ionic strength) and (iii) the structure of the complex are demonstrated.