

ABSTRACT

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Title of Diploma Thesis: Study of quinone and Quantum Dots particles effects on chemiluminescence reaction

A purpose of this Diploma Thesis was to observe and interpret the influence of 9,10-phenanthrenequinone, dithiothreitol and Quantum Dots (QDs) on chemiluminescent (CL) system, which contained hydrogen peroxide, luminol and potassium ferricyanide. All analyses were performed by the flow method of sequential injection analysis (SIA). The chemiluminescent emission of luminol was based on its oxidation by hydrogen peroxide during the catalysis by $\text{Fe}^{\text{III}}(\text{CN})_6$. There is also different CL system, which has been developed by Japanese scientists, consisting quinone, luminol and dithiothreitol. The interest of this thesis was reproducing the results, which were reached by authors of the Japanese study, however with the use of SIA method the results of measurements were not comparable. The 9,10-phenanthrenequinone influenced the CL signal in the sense of shortening the emission length and thereby it is possible to evaluate the difference between the sizes of peak area in single measurements. The solution of dithiothreitol influenced the CL signal in terms of emission length slight shortening. QDs solutions effect was observed with following results: the less diluted QDs solution caused the largest decrease of the peak area and the more shortened emission length of the CL signal. The QDs could be applied in the flow system with good repeatability of the measured results. In case of the CL system with luminol the influence on peak height should be tested with respect to QDs with lower emission maxima, which will correspond to the emission at 425 nm.