

## ABSTRACT

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Title of diploma thesis: Quantum-Dots particles as enhancers for chemiluminescence determinations in SIA system

Quantum-Dots were tested as enhancers of chemiluminescence (CL) emission using sequential injection analysis (SIA). A CL reaction used for this testing was oxidation of luminol (5-aminophthalylhydrazide) by hydrogen peroxide in alkaline medium, QDs represented enhancer of CL signal. The following concentrations of the solutions were tested: hydrogen peroxide in the range  $1 \cdot 10^{-1}$  -  $1 \cdot 10^{-7}$  mol.l<sup>-1</sup>, without QDs and with QDs having maximum emission at 520, 575, 603 a 636 nm and dilution of QDs in following levels 10 µl/10 ml (0.1% solution), 200 µl/10 ml (2% solution) and 200 µl/1 ml (20% solution). The CL emission was detected in two ways. The CL cell, which was constructed at the Department of Analytical Chemistry, FaF UK in HK, and photomultiplier Hamamatsu (Japan) as a detector, enabled monitoring of the CL emission including its time profile. The photomultiplier of the fluorimetric detector Schoeffel (Germany) with spiral flow cell were used for flow measurements in the SIA system. The CL emission was evaluated by peak height and peak area. The best enhancing effects were found for QDs whose maximum emission occurs at 520 nm, diluted to 10 µl/10 ml (0.1% solution), tested with following solutions of hydrogen peroxide:  $1 \cdot 10^{-2}$  mol.l<sup>-1</sup> (measured by the Hamamatsu detector) where the increase of the peak area was of 57.44 % (and the peak height of 128,89 %) compared to the reaction without QDs, or  $1 \cdot 10^{-3}$  mol.l<sup>-1</sup> (measured by the Schoeffel detector) of 4.49 %. A flow cytometer Accuri (California, USA) was used in cooperation with the Department of Pharmacology and Toxicology (FaF UK) to verify a size and granularity of the QDs. They had the most uniform parameters in small particles - QDs having maximum emission from 520 to 603 nm, which are regular.