

## **Flow injection system for mercury ion determination using an Integrated Waveguide Absorbance Optode as a detector.**

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There is a growing consciousness of the need to reduce environmental pollution and highly selective and portable analytical methods for toxic metal ions, such as mercury, are especially required for the quality control of drinking water, sewage, etc.

Ion-selective optode membranes, incorporating a selective ionophore and a lipophilic pH indicator, have been the target of significant research of late. Such membranes have been characterised in flow systems but mainly using bulky conventional optical instrumentation. In this work we report a novel FIA system based on a highly sensitive mercury optode, which employs a new neutral Hg<sup>2+</sup> ionophore based on a thiourea and a ketocyanine dye [1], for mercury determination in water samples. More over, a novel compact optochemical system is used. It consists of new IWAOs [2] constructed with silicon micromachining, LEDs, a PIN photodiode and miniaturised lock-in amplifiers. The set-up includes two different light sources, one being used as a reference signal to correct any deviation due to unspecific optical interferences.

The analytical system has been optimized to reproducibly attain the highest sensitivity in the shorter time. The composition and pH of the conditioning solution has been studied to elicit the best analytical parameters and the short time repeatability of the analytical signal has been evaluated obtaining a reversible enough signal to a reasonable time-scale.

[1] M. Puyol, C. Encinas, L. Rivera, S. Miltsov, J. Alonso. *Sensors and Actuators, B* Available online 18 October 2005. doi:10.1016/j.snb.2005.09.011

[2] M. Puyol, S. Miltsov, I. Salinas, J. Alonso. *Analytical Chemistry*, 2002, 74, 55570-576