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Exploiting the multicommutation approach for calibration using a single standard solution: application to the determination of mercury by CV-AAS

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A flow system, based on the use of solenoid valves, was developed for the implementation of a calibration procedure using a single standard solution. The system is based on the multicommutation flow injection approach using independently controlled solenoid valves for the introduction of reagents and samples.
A single volume of sample or standard solution was injected into the flow system where it merged with an equal volume of reducing reagent (sodium tetrahydroborate). The mixture was transported to the gas separation chamber by an additional channel of carrier solution, and subsequently directed to the AAS. When not injected, solutions were re-circulating to the reservoir bottles, this way reducing significantly the waste produced by the analytical system. The present system was applied to the determination of mercury in fish samples. Accuracy was assessed by recovery studies using certified reference materials as well as spiked samples, and recovery percentages in the range of 92% to 105% were found. The repeatability of the method was better than 5% (RSD, n=10). A limit of detection of 0.10 ng of mercury was achieved.

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