

Form 2

Technology Information	
Area	Strontium immobilization and nuclide analysis in groundwater (Point 6)
Title	LAB ON VALVE FOR THE ANALYSIS OF Sr IN GROUNDWATER
Submitted by	CEA

1. Overview of Technologies**Functions**

Automation of the selective recovery of Sr from water by the use of a lab on valve (LOV).

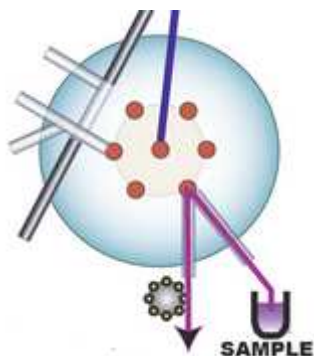
Summary Descriptive

1. Pre-concentration separation procedure to isolate Sr by Solid phase extraction (SPE)
2. Use of a Lab on valve (LOV) to automate the method.

Features & Specifications

LOV concept achieves downscaling of the sample introduction system through integration of the sampling conduit and of the flow cell into a micro-machined compact structure mounted atop a conventional multi-position valve. This technology can be applied to build a Sr-dedicated device for the pre-concentration Sr prior to its quantitative measurement.

Bead Injection (BI) is the third generation of Flow Injection Analyses (FIA) techniques. In its simplest form, microspheres are injected into a conduit, where they are trapped at a selected location. Next, sample zone is injected and perfused through the beads, while sample components react with functional groups on bead surfaces. Retained analyte molecules are detected in their native form by spectroscopy, or reacted in situ with suitable color or fluorescent reagents. Analyte molecules may also be eluted for detection.



Schematic representation of a lab on valve

The equipment is composed of the following parts:

- A pressure system to transport fluids,
- A designed lab on valve containing the specific bead injection for the retention of Sr,
- A control software to drive fluids at each step.

Advantages of the Technology

- Improvement of the analysis time
- Improvement of the reliability of the analysis thanks to automation
- Decrease the sample and reagent consumption (but less than with microfluidics tools),
- Easier integration of various analytical units in the valve and provides great potential for miniaturization of the entire instrumentation,
- Separation/purification steps can be coupled to the detection system.

2. Notes

Technology readiness level

Some examples of lab-on-valve systems are presented in the literature for strontium determination in environmental samples but there are no commercialized solutions yet.

Challenges

- Design and fabrication of the lab on valve,
- separation process optimization,
- Software development.

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