

# *SLOWPOKE and Radiochemical Services*



- *Uranium*
- *Radium 226*
- *Lead 210*
- *Polonium 210*
- *Thorium Isotopes*
- *Total Thorium*
- *NORM*
- *TOX and EOX*

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## SLOWPOKE and Radiochemical Services

SLOWPOKE II is a miniature nuclear reactor housed at SRC Environmental Analytical Laboratories. It is used as an analytical tool for doing neutron activation analysis (NAA).

NAA is a non-destructive technique for specialized analysis of liquid and solid samples. This is carried out by bombarding the sample with neutrons to produce unstable isotopes of the element, which are then quantified by measurement of their gamma emissions.

NAA is currently used for the analysis of uranium in certain sample matrices, and for the analysis of organic halides. There are alternate techniques available for these tests. However, the SLOWPOKE has the advantages of being a non-destructive technique and requiring little sample preparation.

SLOWPOKE is **not** used for the measurement of naturally occurring radioactive elements such as Radium 226, Lead 210, Polonium 210 and the Thorium isotopes. These are measured using alpha, beta or gamma techniques.

**Options available for various parameters and sample matrices are detailed below.**

### Uranium

- **Ground water and Surface water**  
Inductively coupled plasma-mass spectrometry (ICP-MS)
- **Mining liquids**  
Inductively coupled plasma-mass spectrometry (ICP-MS) or SLOWPOKE
- **Soil, Sediments, Biological Tissue, Vegetation**  
ICP-MS
- **Mining exploration samples**  
ICP-MS  
SLOWPOKE  
Titrimetric (>5% U<sub>3</sub>O<sub>8</sub>)  
Fluorometric (SRC Geoanalytical Laboratories)

**Radium 226**      Chemical preparation and  
Alpha spectroscopy or Gamma spectroscopy

**Lead 210**      Chemical preparation and  
Beta counting or Gamma spectroscopy

**Polonium 210**      Chemical preparation and alpha spectroscopy

**Thorium isotopes (228, 230, 232)**  
Chemical preparation and Alpha spectroscopy

**Total Thorium**      ICP-MS or SLOWPOKE

**NORM (Naturally Occurring Radioactive Material)**  
Gamma spectroscopy

**Total Organic Halides (TOX) and Extractable Organic Halides (EOX)**  
SLOWPOKE or Combustion and Amperometric titration