

# Empore™

## Strontium RAD Disks

### Method Summary: Test Method SR-95

### Rapid Determination of Radiostrontium Using Empore™ Strontium RAD Disks

#### Product Description

Empore™ Strontium RAD Disks provide an efficient alternative to conventional radiochemical sample preparation methods that use wet chemistry or packed columns. A proprietary process is used to entrap radium selective adsorbent particles into a matrix of inert PTFE to create a mechanically stable sorbent disk. The disks can be used for purification and concentration of radium from aqueous samples.

Empore strontium RAD disks provide a sample prep solution for large volume aqueous samples and the disk format provides a large surface area for sorbent/sample contact.

#### Scope and Application

This method is intended for determination of radioactive Strontium in aqueous samples. Using Empore strontium RAD disks, sample processing and counting source preparation may be condensed into a single step. This preparation takes approximately 20 min. for a one liter sample and is amenable to batch processing. Total Sr content should not exceed 3 mg to obtain quantitative recovery. For typical one liter samples, Sr retention is greater than 97%. The method detection limit depends on sample volume and counting protocol but generally will be less than 1 pCi/L.

#### Method Overview

An acidified sample is passed through an Empore strontium RAD disk to quantitatively extract the radiostrontium. The disk is then counted for beta activity.

#### Safety

When using solvents or other chemicals, be sure to read and follow the manufacturer's precautions, directions for use and disposal procedures.

#### Apparatus and Materials

- 47 mm Empore Strontium RAD Disks
- 47 mm single or multiple station vacuum manifold
- Beta detector – proportional counter or liquid scintillation counter
- 50 mm planchets or scintillation vials

#### Reagents

- Nitric acid, concentrated and 2M
- Methanol
- Ammonium Hydroxide (optional)
- Acetone (optional)
- Scintillation cocktail (optional)

#### Sample Collection, Preservation, and Handling

Acidify the sample to 3 M with concentrated nitric acid. If visible solids are present in the sample, prefilter through a 0.45µm filter if exclusion is desired.

#### Empore Strontium RAD Disk Utilization

**Proper disk utilization is critical for successful extraction and counting.**

1. Mount an Empore strontium RAD disk in the vacuum manifold. Place the side marked "Side Down" against the filter support.
2. Condition the disk by covering it with 5 mL methanol and then slowly drawing the methanol through the disk with a gentle vacuum. Do not allow the disk to dry.

3. Wash the disk immediately with 20 mL of 2M nitric acid at a flow rate of approximately 50 mL/min.
4. Treat the sample by pulling it through the disk at an approximate flow rate of 50 mL/min.
5. Rinse with 20 mL of 2M nitric acid (at approximately 50 mL/min). The end time of this rinse is recorded at the start of the <sup>90</sup>Y ingrowth.

**Note: The disk should not be allowed to completely dry during the preconditioning and sample processing steps.**

**Excessive air should not be drawn through the membrane since airborne radon decay products could pose radiometric interferences if the disks are counted the same day.**

### Counting Options

Disks may be counted by either proportional or scintillation counting. The instrument type, counting times and frequency of counts are dictated by the isotope(s) of interest and the data quality objectives. Radioactive ingrowth and decay corrections must be applied.

For use with a proportional counter, the disk must be dry and free of acid. Dry with acetone or in an oven. The loaded disk must be placed in the planchet obscuring "This Side Down."

For use with a scintillation counter, place disk (before disk dries) into a vial containing scintillation cocktail.

For full details on test procedure and possible interferences, consult test method "Rapid Determination of Radiostrontium using Empore Strontium RAD Disks".

### Reference

S. C. Goheen, editor, *DOE Methods for Evaluating Environmental and Waste Management Samples*. Battelle Press, Columbus, OH (1997). Method RP515, Rapid determination of radiostrontium using Empore™ Strontium RAD Disks.

**Note:** Empore Solid Phase Extraction Products are intended for solid phase extraction during scientific research only. These products are not intended for use in medical devices or in assessment and treatment of clinical patients.

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Printed in the USA. Issued: 1/09  
6345HB 98-0504-1699-3  
LITEMP017 0309

