Empore™

Solid Phase Extraction Disks

Anion Exchange

General Information

Empore™ Solid Phase Extraction (SPE) Disks provide an efficient alternative to liquid/liquid extraction for sample preparation. A proprietary process is used to entrap 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 analytes from aqueous samples.

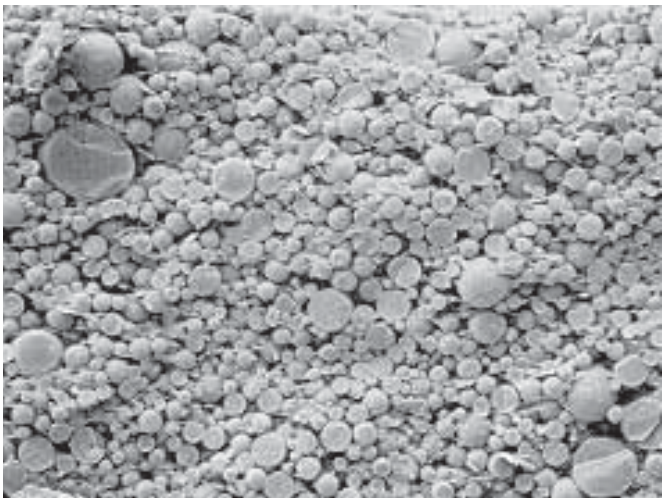
Empore SPE disks provide a sample prep solution for large volume aqueous samples. The disk format provides a large surface area for sorbent/sample contact. Fast flow rates and high throughput may be realized with use of an Empore solid phase extraction disk.

Product Information

Ion exchange solid phase extraction is a procedure for extracting ionized species from aqueous samples. Empore™ Anion Exchange Disks are suggested for the extraction and recovery of negatively charged ions such as analytes with carboxylic acid functionality.

Suggested Product Applications

Sorbent	Suggested Applications	Product Number	
		47 mm	90 mm
Anion Exchange	• EPA Method 548.1 (Endothall in Drinking Water) • EPA Method 552.1 (Haloacetic Acids and Dalapon in Drinking Water) • Carboxylic acid metabolites of the herbicide Dacthal and other compounds • Removal of humic and fulvic acid interferences from water samples	2252	2352



High Density (HD) Empore™ Membrane (10-12 µm particle size)

CDS Analytical

Extraction Method with Anion Exchange Disk

Step A: Sample Preparation

- Adjust sample pH as necessary to ensure that analytes are ionic. Raise sample pH at least 2 unites above the pK_a of the analytes being extracted.
- Dilute sample with water as needed to reduce ionic strength to < 0.1 M.
- Filter Aid 400 and/or prefiltration may be helpful if the sample contains excessive suspended solids.

Step B: Extraction Disk Conditioning

Disk conditioning is critical for a successful extraction. Conditioning provides a good interface between the sorbent and the sample matrix. **Failure to condition the extraction disks properly will result in erratic and low recoveries.**

1. Center the extraction disk on the base of the filtration apparatus and clamp the reservoir on top of the disk.*
2. Wash the disk with 10 mL of acetone or other solvent. Apply vacuum and dry the disk.
3. Add 10 mL methanol to the disk. Apply vacuum and pull approximately 1 mL through the disk. Vent the vacuum and allow the disk to soak for 30 seconds before reapplying vacuum. Pull the methanol through the disk until it is just above the surface of the extraction disk. This step should be followed by the following sequence of solvents in 10 mL aliquots: Reagent water, 1 M sodium hydroxide, reagent water. The conditioning solutions can be pulled through the extraction disk at full vacuum. DO NOT ALLOW THE DISK TO DRY. Always leave 3-5 mm of liquid above the surface of the disk. **If disk becomes dry while conditioning with the above solutions, repeat Step 3.**

* Place a vial in the vacuum apparatus to collect and dispose of wash and conditioning solvents. Remove vial prior to sample extraction.

Step C: Sample Extraction

- Pour the sample into the reservoir and apply vacuum to draw through the disk. Flow rate is dependent on vacuum setting and solids content of the sample. However, recoveries are not affected by flow rate.
- After sample extraction is complete, remove residual water from the disk by applying vacuum to dry the disk for approximately 5-20 minutes.

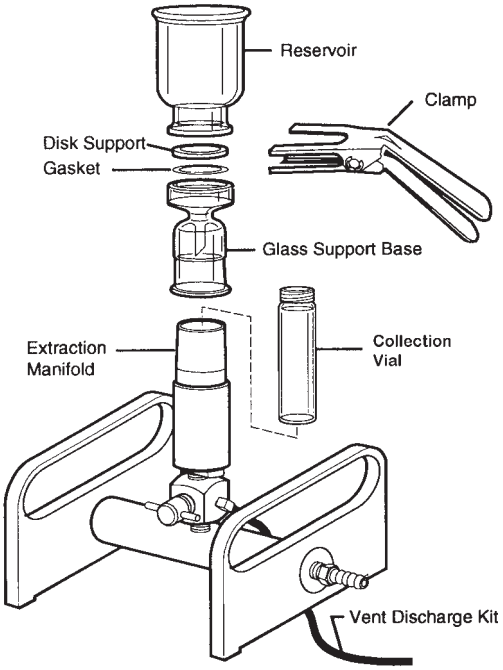
Step D: Sample Elution

Two elutions with 10 mL solvent are recommended. Smaller volumes of solvent may be used if the elution technique has been optimized. Elution can be enhanced by the selection of a high selectivity counterion, high ionic strength solution and a pH adjustment to 2 units lower than the pKa of the analytes being extracted. Very strong acids such as sulfonates may be difficult to elute from anion exchange disks.

- Place tip of filter base into the collection vessel (see diagram).
- Add 10 mL elution solvent to sample container, rinsing down the sides. Transfer solvent from sample container to reservoir with a pipet, washing the walls of the reservoir in the process.

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

Disk Manifold System Setup



Volume Guidelines

The small bed mass of sorbent in the Empore™ membrane allows for the use of smaller solvent volumes compared with traditional SPE products. A general guide to solvent volumes for a disk SPE method using anion exchange is listed in the table below.

Each assay will need some further optimization in terms of selecting the best elution solvent (commonly methylene chloride, methanol or acetonitrile).

EPA Methods will require specific reagents; please refer to those methods when using the Empore Disks for agency reporting.

Volume Guidelines: Anion Exchange

Step	Solvent	47 mm disk	90 mm disk
Condition	Methanol	10-15 mL	20-30 mL
Optional:	Reagent water	10-15 mL	20-30 mL
Aqueous	Sample solution	100-1000 mL	500-2000 mL
Elute	Eluting solution	10-15 mL	20-30 mL

Note: Suggested solvent volumes will vary according to the disk diameter, the amount of filter aid material, the analyte, the analyte's affinity for the chosen sorbent, and the strength of the eluting solvent. A general guide for solvent volumes is to completely cover the disk and bed of filter aid, such that 2-3 mm of solvent is above the top surface.

Product Characteristics

Composition	90% or greater sorbent particle 10% or less PTFE
Thickness	0.50 mm ± 0.05 mm
SPE Flow Rate	< 10 min/L DI H_2O @ 25°C @ 20 inHg (47 mm disk)
Particle Size	12 µm (nominal)
Solvents	Compatible with all organic solvents
pH Range	Stable between 1 and 14 under normal use conditions

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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