



General Information

Handling and Storage

The disks may be handled in the same manner as most typical filter membranes. Because of the adsorptive properties of the disk, handling with non-metallic instructions is recommended. Washing the disks prior to sample extraction also removes contaminants (see step 2 under Extraction Disk Conditioning.)

Recommended Usage

Empore™ Extraction Disks are used in a manner similar to other commercially available membrane filters. Filtration equipment is available from a number of different suppliers, and includes in-line filter holders, glass filtration apparatus, and multiple filtration manifolds. BUCHNER FUNNELS ARE NOT RECOMMENDED.

Applications

Empore Extraction Disks with Chelating Resin may be used for the extraction of trace metal ions from water samples, food extract, soil extracts and physiological fluids.



Contact Information

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Empore™

Chelating Extraction Disks
For Environmental Analysis

for use with 47 mm and 90 mm extraction apparatus

Instructions for Use

Note: Empore Sample Preparation 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.

General Product Characteristics

Description

Empore Chelating Disks are a unique product for the solid phase extraction of multivalent metal ions. A proprietary process is used to entrap adsorbent particles into a matrix of inert PTFE to create a mechanically stable sorbent disk.

Formulation

90% ± 2% sorbent particles
10% ± 2% PTFE

Product Characteristics

Thickness: 0.5 mm ± 0.05 mm
SPE Flowrate: 8-15 mL DI H₂O @ 25° C @ 20 in Hg (47 mm disk)

Solvents: Compatible with water and all organic solvents. Disk may swell in some organic solvents.
pH: Stable over the entire pH range.

Ionic form: Sodium salt of iminodiacetic acid.



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Suggested Application Procedures

General: Water Analysis

Empore™ Extraction Disks with Chelating Resin provide a rapid, efficient method for purification and concentration of samples prior to final analysis.

The enclosed instructions are general guidelines for use. Sample volume, solvent type, and conditioning may be changed to adapt to specific methods and analytes as needed and determined by user.

Extraction Equipment

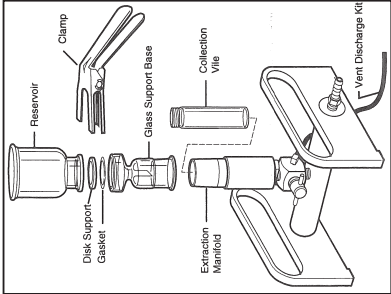
- 47 mm or 90 mm Empore Extraction Disks
- 47 mm or 90 mm glass filtration apparatus
- Vacuum source

Sample Preparation

- Empore Filter Aid 400 (cat # FA400) and/or prefiltration may be helpful if the sample contains excessive suspended solids.



Suggested Vacuum Apparatus



Note: Suggested solvent volumes will vary according to the disk diameter and the amount of Filter Aid 400/filter material. A general guide for solvent volumes is to completely cover the disk and bed of filter material, such that 2-3 mm of solvent is above the surface. Repeat with second aliquot.



Extraction Disk Conditioning

The Empore™ Chelating Disk should be wet directly with water.

PREWETTING WITH AN ORGANIC SOLVENT SUCH AS METHANOL IS NOT RECOMMENDED. SUCH PREWETTING WILL NOT IMPROVE FLOW RATE, BUT WILL CAUSE THE DISK TO WRINKLE.

For many applications, the disk can be used directly; however, for very low level (ppb) metal analysis and maximum activity, the disks should be preconditioned. The following procedure is recommended for conditioning the 47 mm disk.

1. Place the disk in a glass filter holder (see diagram). A Kel-F® filter screen is recommended.
2. Apply vacuum to the dry disk (20 in. Hg/0.68 bar is typical), then wet the disk with about 20 mL of water.
3. Wash the disk with 20 mL of 3 M nitric acid or 3 M hydrochloric acid followed by two 50 mL water washes. Let the disk go dry between each wash.
4. To put the disk in the ammonium form (its most active form), wash with 50 mL of 0.1 M ammonium acetate buffer at pH 5.3 followed by several water washes. It is essential that this reagent be free from analyte metals of interest.



Sample Extraction

In the ammonium form, the Chelating disk will bind most multivalent metal ions such as Cu+2, Pb+2, Cd+2, Fe+3, etc. The selectivity of the membrane roughly follows the EDTA complex formation constants for various metal ions (Pb>Cu>Cd>Co>Fe>Ca>Sr). Capacity is generally higher at pH 5 and above. Tighter binding ions such as Cu+2 and Pb+2 will displace other ions when capacity is reached.

- Pour the sample into the reservoir and apply vacuum. In general, recovery of tightly binding metal ions is not affected by flow rate; however, in some cases, recovery will be improved at slower flow rates. Flow rate is dependant on vacuum source and particulate content of the sample. Flow rates through individual extraction disks may vary.
- After sample extraction is complete, remove as much residual water as possible from the disk by applying vacuum to the disk for several minutes until dry.

Sample Elution

Elution of metals from the Chelating disk is achieved with strong acid such as 3 M nitric acid or 3 M hydrochloric acid. For the 47 mm disk in a standard glass holder, 95% recovery of most metals can be achieved by eluting twice with 10 mL of 3 M nitric acid or 3 M hydrochloric acid and combining the eluates. For a one-liter sample, this will yield a fifty-fold increase in the concentration. A few metals such as chromium may be difficult to elute, particularly if left on the disk for several hours.