Welchrom® SPE Operation Instruction

Mechanism of SPE

Solid Phase Extraction(SPE) is a separation technique which combines selective retention and selective elution, etc. In fact, SPE is a column chromatography separation process, its separation mechanism, selection of solid phase and solution have many similarity with HPLC. Samples get through adsorbent, analyte and impurities are retained in the column, then remove the impurities with selective solvent to get the analyte. SPE separate mode mainly depends on the type of bulking materials and the property of the solvents.

Welchrom®SPE Introduction

Welchrom®SPE series, contain silica based SPE, non-silica inorganic SPE, polymeric SPE and mixed-mode SPE.

1. Silica-Based SPE

Silica-based SPE include C18E(endcapped), C18(not endcapped), C8, Phenyl, Silica, CN, NH_2, PSA(diamine), SCX, SAX, WCX, WAX, PRS and other 13 kinds of packing.

The sorbent currently most commonly used in SPE is still the silica gel or bonded silica gel, and its pH scope of application is pH 2-8.

2. Non-Silica Inorganic SPE

Non-silica inorganic SPE sorbents include six normal phase adsorbents: Florisil, Alumina-N (neutral alumina), Alumina-A (acidic alumina), Alumina-B (basic alumina), Celite and Polyamide.

They are all normal phase adsorbents, have different polarity and basicity, and provide different selectivity and adsorption than normal phase silica gel for the cleanup and analysis of complex matrix samples.

3. Mixed mode SPE

Welchrom® SPE has five kinds of mixedadsorbents: C8/SCX, GraphiCarb/NH_2, SiO_2/C18E, C8/CN, special column for tea leaf and etc.

Mixed mode SPE has mixed forces made its application range larger than common SPE column, could use in some applications that is hard to solve with common SPE columns.

4. Polymeric SPE

Polymeric SPE have been in rising trend year by year. Welchrom® polymer–based SPE is made from monodisperse polymer beads, and currently includes five different sorbents to meet your needs: BRP, P-SCX, P-SAX, PS/DVB, and P-WAX. Polymeric Welchrom®SPE sorbents have the following advantages over silica sorbents:

- A wide pH range (0-14); suitable for most organic solvents.
- No active surface silanols; no loss of basic compounds due to the secondary adsorption.
- High binding capacity, high recovery rate, and betterconsistence.
- Low the detection limit, good for trace amount analysis.
- No hydrolysis of the bonded phase like silica substrate; nocontamination.
- pherical particles and narrow particle size distribution, toensure reproducibility of results.
- Easy to use; if accidently dried in the process, the cartridgeis still usable, and there is no risk of losing the analyte or the result.
- Superior retention with a wide pH range for a wide pKa range of compounds.

Ion chromatography pretreatment column:
IC-RP, IC-P, IC-H, IC-Na, IC-Ag, IC-Ba, IC-A, IC-M

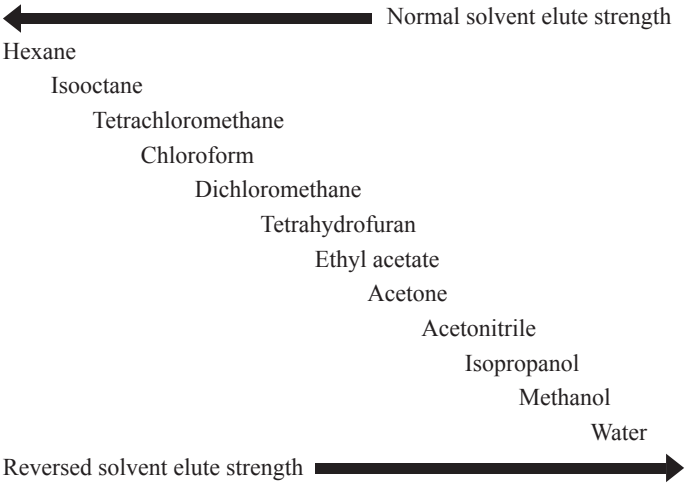
Welchrom®SPE guide of usage

1. Reversed packing materials(C18, C8, BRP, NH_2, Phenyl, CN, PSA)
Analyte: non-polarity to medium polarity
Matrix: aqueous solution
General Extraction Protocol:
Activation: Water-soluble organic solvent, such as Methanol, then equilibrate with water
Wash: 0-50% polar solvent buffer solution
Elute: polar or non-polar solvent to elute target object

2. Normal packing materials(Silica, NH_2, CN, Florisil, Diol, GraphiCarb, Alumina-A/B/N)
Analyte: medium polarity to strong polarity
Matrix: non-polarity to medium polarity
General Extraction Protocol:
Activation: non-polar organic solvent (same as the sample solvent in general)
Elute: non-polar organic solvent (same as the sample solvent in general)

3. Anion exchange(SAX, P-SAX)
Analyte: anion(acid) compound
General Extraction Protocol:
Activation: sample in non-polar organic solvent, active with sample solvent
Sample in polar solvent, active with aqueous-organic solvent, and equilibrate with water, then buffer solution with proper pH.
Load: pH of sample solvent must be 2 units larger than its pKa to ensure the ionic condition.
Elute: pH of elute solvent must be 2 units smaller than its pKa to make target be compound Condition

4. Cation exchange(SCX,PRS, P-SCX)
Analyte: cation (basic) compound
Activation: sample in non-polar organic solvent, active with sample solvent
sample in polar solvent, active with aqueous-organic solvent, and equilibrate withwater, then buffer solution with proper pH.
Load: pH of sample solvent must be 2 units smaller than its pKa to ensure the ionic condition.
Elute: pH of elute solvent must be 2 units larger than its pKa to make target be molecule Condition.
One material can be used in different mechanism, such as C18 can be used as reversed materials, also can be used as adsorb material to adsorb fat, pigment and other impurities. The method must be designed with the fact.



5. Welchrom IC Pretreatment column

(1) IC-RP, IC-P(reversed adsorb mechanism)
Activation: 5mL methanol, 10 mL pure water, standing 10min to fully equilibrate
Purification: push the sample solvent through the column with injection syringe, flow rate 4mL/min. The column must be keeping vertical. To avoid the dilution of the sample solvent, so a part of the activate solvent must be removed. The abandoned part is related to the specification of the column. For 1 mL column, 3mL sample solvent, 2.5 mL column, 6mL sample solvent.

(2) IC-H, IC-Na, IC-Ag, IC-Ba, IC-A(ion exchange mechanism)
Activation: 10 mL pure water, flow rate 2mL/min. The column must be keeping vertical. To avoid the dilution of the sample solvent, so a part of the activate solvent must be removed. The abandoned part is related to the specification of the column. For 1 mL column, 3mL sample solvent, 2.5 mL column, 6mL sample solvent.

(3) IC-M(chelate mechanism)
Activation: 10mL 2.0M, pH 5.5 acetic acid solution, standing 10min to fully equilibrate.
Purification: use injection syringe push the sample solvent through the column, flow rate 2mL/min. The column must be keeping vertical. To avoid the dilution of the sample solvent, so a part of the activate solvent must be removed. The abandoned part is related to the specification of the column. For 1 mL column, 3mL sample solvent, 2.5 mL column, 6mL sample solvent.

Welchrom® SPE preservation

Room temperature, shielded from light, seal

Welchrom® SPE products quality assurance

- Guarantee quality of every lot of packing materials, set quality control.
- Dust-free production workshop, flow line production, avoid contamination.
- Special SmoothPak™ technique, exceptional lot-to-lot reproducibility.
- Perfect after-sale service.

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