

Whereas with ion exchangers (mainly) charged molecules can be adsorbed and/or separated, *neutral* adsorbent resins can be used for the *extraction* and in some cases even for *separation* of neutral, basic and acidic substances. This adsorption process often is performed with compounds which are dissolved in water or in a solution which does not contain too much of an organic solvent that might prohibit the interaction (van der Waals forces, hydrophobic, hydrogen bridges) between adsorbent and adsorbate.

We offer 2 types (polar and unpolar). The unpolar types (SERDOLIT® PAD I, II, III) are copolymerisates of polystyrene and DVB, whereas the polar is a polymerized methacrylic acid ester (SERDOLIT® PAD IV). The physical properties are summarized in table 1. Generally speaking the larger the surface, the higher the capacity.

Unpolar resins (PAD I - III) bind organics from water, polar SERDOLIT® PAD IV even from organic solvents. Unwanted substances (impurities, salts) are eluted with water, the enriched compound(s) with water mixable organic solvents. Their eluotropic forces are known from chromatographic experience. Acidic molecules are best eluted with basic eluents, basic molecules under acidic conditions.

Table 1: Physical Properties of SERDOLIT® PAD Resins

Type	Specific surface [m ² /g]	Polymer	Pore volume (ml/g)	Pore size [nm]	Polarities low medium
PAD I	250	DVB styrene	0.6	25 - 30	PAD I, PAD III
PAD II	450	DVB styrene	0.25	15 - 20	PAD II,
PAD III	1000	DVB styrene	0.3	*	PAD IV
PAD IV	250	acrylic copolymerisate	0.55	25 - 30	

* Contains a wide range of por sizes (from microporous to macroporous)

Applications

In most cases the neutral adsorbents are used for solid phase extraction (SPE). Here the time and organic solvent consuming steps (using a separation funnel) are omitted. For SPE, some milliliters of the adsorbent simply are filled into a pipette, funnel or cartridge, wetted with a water miscible organic solvent (dried particles are water repellent) which then is replaced by water.

We offer highly purified (analytical grade) adsorbents which are prewetted (hydrophilized) and can be used straight away. These fine mesh resins may be used not only for SPE but also in the well known reversed phase low and medium pressure chromatography up to 10 bars (140 psi) with the advantage to be hydrolytically stable within the entire pH range.

Table 2 lists compounds from water resp. waste water, as an example for the usage of adsorber resins.

Table 2: Water and waste water ingredients adsorbed with adsorber resins

- Acenaphthene	- m-Chlorophenol	- n-Hexanol	- Naphthalene
- Acenaphthylene	- o-Cresol	- Humic acid	- p-Nitrophenol
- Alkylbenzothiophenes	- Dichloroaniline (DCA)	- Indene	- Phenylenediamine
- Alkyl-2,3-dihydroindene	- 2,4-Dichlorophenol (DCP)	- Isopropylbenzene	- Phenol
- Alkylnaphthalenes	- 2-(4-dichlorophenoxy) acetic acid (2,4-D)	- Methylene dichloride	- Tetrachloroethylene
- Aniline	- 2,3-Dihydroindene	- Methylindenes	- Toluene
- Benzene	- 2,4-Dimethylphenol	- Methylisobutylketone	- Trichloroethylene
- Benzoic acid	- Ethylbenzene	- 1-Methylnaphthalene	- 2,4,6-Trichlorophenol
- 2-2-Benzothiophene	- Ethylbutyrate	- 2-Methylphenol	- Xylene
-2-(4-chloro-2-methylphenoxy) propionic acid (CMPP)	- Ethylendichloroethane (EDC)	- 4-(2-methylphenoxy) acetic acid (MCPA)	