

## SERDOLIT<sup>®</sup> Chelating Resins

### SERDOLIT<sup>®</sup> Chelite<sup>®</sup> CHE (cat. no. 40581)

Macroporous (macroreticular) polystyrene based resin derivatized with iminodiacetic acid groups. These have a high affinity for heavy metal cations over alkali or alkaline earth metals. The macroreticular structure provides high resistance to osmotic shock and short ion diffusion paths resulting in improved kinetics. The apparent selectivity for a given metal depends upon concentration, the presence of other species, and pH. In the table below some findings at different pH values are depicted. These data provide a guideline of relative selectivities.

The affinity of the resin for a given metal can be increased or decreased by adjusting the pH. Many feed streams contain particular matter which can clog the exchanger bed. Backwashing is necessary at regular intervals. If glass columns are used, the swelling (hydraulic expansion) of the resin must be considered. The resin swells 100 % during change from the hydrogen to monovalent salt form. Thus regeneration is best done in a funnel first with 10 % acid, then 10 % caustic and finally water to neutrality of the eluent.

To obtain the desired pH, buffer solutions are preferably used. As an example, for pH 4, 10 bed volumes of a 0.5 M solution of NaH<sub>2</sub>PO<sub>4</sub>/Na<sub>2</sub>HPO<sub>4</sub> adjusted to pH 4 and finally 10 volumes of water are percolated.

As SERDOLIT<sup>®</sup> Chelite<sup>®</sup> CHE has an extremely high affinity for polyvalent cations, the amount of regenerant is higher than required for conventional weakly acidic ion exchange resins.

**Table 1: Selectivities of SERDOLIT<sup>®</sup> Chelite<sup>®</sup> for cations at different pH values**

1) pH = 2		2) pH = 4		3) pH = 9 *	
Metal ion	K <sup>M</sup> <sub>Ca</sub>	Metal ion	K <sup>M</sup> <sub>Ca</sub>	Metal ion	K <sup>M</sup> <sub>Ca</sub>
Fe <sup>+++</sup>	325,000	Hg <sup>++</sup>	2,800	Ni <sup>++</sup>	30
Cu <sup>++</sup>	130,000	Cu <sup>++</sup>	2,300	Cd <sup>++</sup>	14
Hg <sup>++</sup>	> 43,000	Pb <sup>++</sup>	1,200	Cu <sup>++</sup>	10
Au <sup>+++</sup>	> 8,100	Ni <sup>++</sup>	57	Zn <sup>++</sup>	3
Ag <sup>+</sup>	4,600	Zn <sup>++</sup>	17	Ca <sup>++</sup>	1.0
Ni <sup>++</sup>	3,200	Cd <sup>++</sup>	15		
Cd <sup>++</sup>	620	Co <sup>++</sup>	6.7		
Fe <sup>++</sup>	190	Fe <sup>++</sup>	4.0		
Mn <sup>++</sup>	120	Mn <sup>++</sup>	1.2		
Zn <sup>++</sup>	120	Ca <sup>++</sup>	1.0		
Al <sup>+++</sup>	50				
Mg <sup>++</sup>	20				
Ca <sup>++</sup>	1.0	* very high ammonium background (200 g/l (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> )			

## SERDOLIT® Chelite® P (cat.no. 41706)

Polystyrene matrix, crosslinked with DVB, containing aminomethylphosphonic groups. It can be distinguished from SERDOLIT® Chelite® CHE by its greater affinity for cations of low atomic mass. It has high selectivity for transition and heavy metals (Pb, Cu and Zn in particular). The resin swells about 40 % during its transformation from the hydrogen to the sodium form, so the same precautions as described above must be applied.

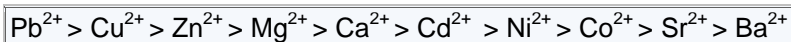
### Operating pH range

The resin can operate in a neutral, acidic or alkaline medium, but since its capacity depends on the pH, we recommend the following minimum pH values:

Minimum pH	2	2.5	3	4.5
Cations	Cu <sup>2+</sup> Pb <sup>2+</sup>	Zn <sup>2+</sup>	Cd <sup>2+</sup> Ca <sup>2+</sup>	Mg <sup>2+</sup> Ni <sup>2+</sup> Sr <sup>2+</sup> Co <sup>2+</sup>

### Relative affinity

The relative affinity of this resin for the various cations decreases in the order shown below:



### Characteristic reaction

