

UNLOCK YOUR PROFITS WITH CHELOK®!

TIME FOR A NEW PARADIGM

Periodic Products' Chelok technology represents an entirely new way of removing and concentrating metals from water, ore, soil and ash. Rather than treating contaminated water with chemical precipitants or ion exchange resins, these water and organic insoluble, non-toxic polymers rapidly adsorb dissolved heavy metals.

WHY USE CHELOK?

Chelok polymers rapidly and cost effectively remove, extract, eliminate, and concentrate metals from water, ore, soil and ash. With the ability to work passively or actively, Chelok polymers have a metal binding capacity approximately 500 times greater than those of ion exchange systems. Chelok polymers display a variety of properties:

- Work over a broad temperature range.
- Effective at high TDS concentrations.
- Exhibit rapid kinetics.
- High metal binding capacity.
- Work over broad range of pH.
- Concentrate and recover metals.
- Passive and active applications.
- Low environmental impact.
- Cost effective.
- Scalable.



CHELOK POLYMERS vs. ION EXCHANGE PERFORMANCE COMPARISON

CHELOK

Effective from pH 1 to 14
Effective at High TDS
Effective in High Calcium Concentrations
High Capacity – Effective Concentration of Metals
Binds Wide Array of Metals

VS

ION EXCHANGE

Narrow pH Range
Ineffective in High TDS
Ineffective in High Calcium Concentrations
Low Capacity–Ineffective Concentration of Metals
Binds Narrow Array of Metals



WHAT IS CHELOK

Chelok is Periodic Products' patented series of chelating polymers which are the result of more than two decades of biochemical research and development. Rather than using contaminated wastes with chemical precipitants or ion exchange resins, these water insoluble polymers adsorb dissolved heavy metals, which can be easily filtered to separate the metal-containing polymers. The recovered metals in this process can increase yields providing additional economic and environmental benefits. Since Chelok chelating polymers retain their metal-binding ability after metals have been recovered, the polymers can be reused. These chelating polymers exhibit the following beneficial characteristics:

- Rapid Kinetics – Second-order Kinetics
- Favorable Thermodynamics
- Large Particle Size – Ease Of Filtration
- High Capacity (Binds up to Its Weight per Cycle, 500x typical IX resin)
- Low Affinity For Group 1 & Group 2 Metals
- Do Not Contain N, S, P
- Water-insoluble, Non-toxic, Reusable
- No Solid Waste Generation
- No Destruction of Polymer
- Metals and Rare Earth Elements Recoverable

CHELOK BINDS AND CONCENTRATES THESE METALS

Chelok polymers are able to bind and extract the elements highlighted in the table below. More elements are being added as additional research is completed.

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<div><div><div>1 H Hydrogen</div><div>3 Li Lithium</div><div>11 Na Sodium</div><div>19 K Potassium</div><div>37 Rb Rubidium</div><div>55 Cs Caesium</div><div>87 Fr Francium</div></div><div><div>4 Be Beryllium</div><div>12 Mg Magnesium</div><div>20 Ca Calcium</div><div>38 Sr Strontium</div><div>56 Ba Barium</div><div>88 Ra Radium</div></div><div><div>5 B Boron</div><div>13 Al Aluminum</div><div>21 Sc Scandium</div><div>39 Y Yttrium</div><div>57-71 Lanthanoids*</div><div>89-103 Actinoids**</div></div><div><div>6 C Carbon</div><div>14 Si Silicon</div><div>22 Ti Titanium</div><div>40 Zr Zirconium</div><div>58 Ce Cerium</div><div>90 Th Thorium</div></div><div><div>7 N Nitrogen</div><div>15 P Phosphorus</div><div>23 V Vanadium</div><div>41 Nb Niobium</div><div>59 Pr Praseodymium</div><div>91 Pa Protactinium</div></div><div><div>8 O Oxygen</div><div>16 S Sulfur</div><div>24 Cr Chromium</div><div>42 Mo Molybdenum</div><div>60 Nd Neodymium</div><div>92 U Uranium</div></div><div><div>9 F 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DEMONSTRATED APPLICATIONS

- Water
- Ash
- Adit Water
- Industrial Effluent
- Incinerator Ash
- Ore
- Sand
- Tailings Ponds
- Phosphate Waste Products
- Bauxite Residue (Red Mud)
- Coal
- Clay
- River Sediment
- Phosphoric Acid
- Marcellus Shale Cuttings