

SPR-IDA

Reagent for Preconcentration/ Matrix Elimination

SPR-IDA (Suspended Particulate Reagent – Iminodiacetate) is a sample preparation material for preconcentration of trace elements and reduction of high alkali metal (e.g. Na) sample matrix levels. The reagent consists of 10 micron diameter polymer beads that have been chemically derivatized with the iminodiacetate chelating agent. Small aliquots of the reagent can be added in a batch mode to a sample and separated with bound metals by gravity or centrifugation.



The determination of trace elements in liquid samples such as seawater and brines presents a number of challenges for ICP-MS. The high dissolved solids content (approx. 3.5%) of seawater can suppress analyte signal, cause mass spectral interferences, and clog the ICP-MS interface sampler and skimmer cones.

A seawater sample can be diluted, but at the expense of detectability as some elements of interest are in the 5 to 50 ppt (ng/L) range. An alternative is a sample preparation method that can selectively preconcentrate trace elements while having much less affinity for major matrix components such as Na, K, Ca, and Mg.

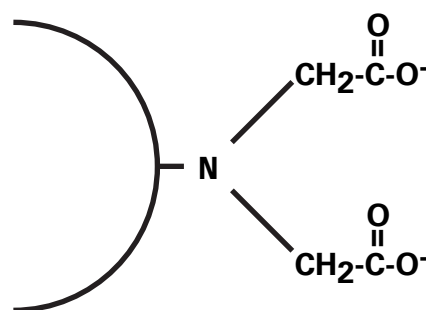
A chelating polymer resin called SPR-IDA (Suspended Particulate Reagent – Iminodiacetate) can be used for preconcentration / matrix elimination of samples such as seawater. SPR-IDA consists of a suspension of 10 micron diameter polymer beads that have been derivatized with the chelator iminodiacetate. The beads are supplied as a 10% suspension in deionized water and can be easily pipetted into a sample. A typical bead suspension aliquot is 0.1 mL per 15 mL of seawater sample.

After SPR-IDA addition, the sample pH is adjusted to 8 and the beads are separated by gravity or a short (3 to 5 minute) centrifugation. The supernatant liquid is removed and the beads may be washed to remove more of the remaining unbound sample matrix. Dilute nitric acid is then added to the bead residue to release bound analytes and the extract analyzed via conventional nebulization by ICP-MS. Important elements that are chelated by SPR-IDA include Al, Cd, Co, Cu, Fe, Mn, Ni, Pb, U, and Zn.

This batch mode method with SPR-IDA has a number of important advantages versus online columns:

- Sample preparation can be done offline, saving valuable ICP-MS running time (argon gas, electricity) that is lost during column loading, washing, and elution steps.
- The SPR-IDA bead aliquot is used only once, avoiding sample memory effects from incomplete column elution.
- No additional complex, costly liquid handling hardware (e.g. injection and switching valves) are needed.

Iminodiacetate (IDA) on SPR Bead



Specifications:

Chelating Agent: Iminodiacetate (IDA)

Bead Substrate: Polystyrene

Average Bead Diameter: 10 microns (0.01 mm)

Bead Capacity: 75 mg Cu / 1 gram of beads

Bead Suspension: 10% w/v