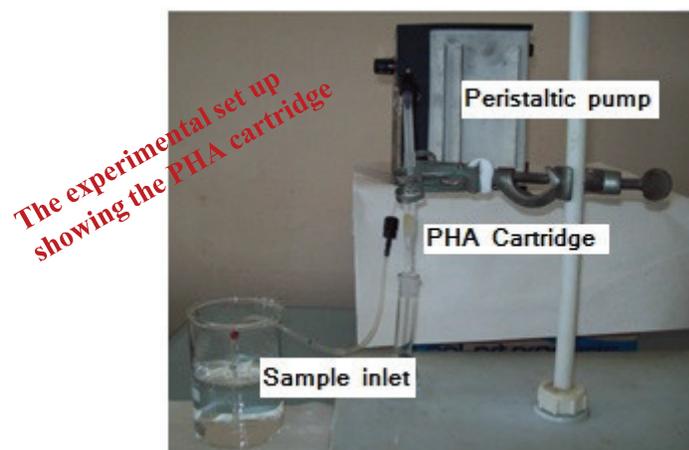


Matrix separation and preconcentration of rare earth elements from seawater by poly hydroxamic acid cartridge followed by determination using ICP-MS

The determination of rare earth elements in seawater is a challenge due to high salt content of seawater and extremely low concentrations of rare earth elements. Therefore separation of matrix and preconcentration of rare earth elements is necessary for their detection by inductively coupled plasma mass spectrometer. In the present work polyhydroxamic acid was used in a self fabricated glass cartridge for the preconcentration of La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu simultaneously from seawater. The Major matrix elements such as Na, K and Mg were separated in a single stage with the achievement of a preconcentration factor of 100 for rare earth elements. The uptake of rare earth elements by PHA was >95% in a wide pH range of 3–7. The limit of detection as calculated by taking synthetic seawater was between 0.08 to 0.44 ng L⁻¹.



Concentration and detection limit of rare earth elements in seawater

Elements	LOD ^a (ng L ⁻¹)	SW 1 ^b (ng L ⁻¹)	SW2 ^b (ng L ⁻¹)
Y	0.44	12.28±0.59	12.58±0.60
La	0.16	4.19±0.18	3.97±0.20
Ce	0.18	8.18±0.39	8.09±0.38
Pr	0.14	2.19±0.11	2.28±0.12
Nd	0.16	3.29±0.15	3.59±0.20
Sm	0.15	1.57±0.06	1.88±0.07
Eu	0.21	0.59±0.02	0.59±0.03
Gd	0.19	1.68±0.08	1.78±0.07
Tb	0.18	0.49±0.02	0.48±0.02
Dy	0.16	1.19±0.05	1.29±0.06
Ho	0.17	0.58±0.02	0.69±0.02
Er	0.19	1.29±0.05	1.27±0.04
Tm	0.14	0.39±0.02	0.39±0.02
Yb	0.17	1.29±0.06	1.38±0.07
Lu	0.13	0.28±0.01	0.29±0.01

^aMean + 3s, ^bMean ± SD

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