

Development of Analytical Method Based on Systematic Approach of Column Preconcentration/Determination of Toxic Metal Ions in Environmental Samples Using Graphene Oxide Based Solid Phase Extractant

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Layered graphene oxide (GO) with two-dimensional carbon lattice is linked to styrenic carbon of porous XAD polymeric resin through azo spacer arm without utilizing any oxygen containing functional group for the first time. This approach makes all the epoxy, hydroxyl, carbonyl and carboxyl groups on axial and basal plane of GO sheet available for coordination with metal ions and introduction of hydrophilic character resulting in highest preconcentration factor for Pb (500) among the GO-composites used as solid phase extractant in column operation. The analytical method developed using XAD-GO for preconcentration of Pb, Cd and Zn ions enables the use of an economically viable less sensitive AAS for their trace determination in water samples due to the improved limit of detection (0.41, 0.41, 0.13 $\mu\text{g L}^{-1}$) and quantification limit (1.38, 1.36, 0.42 $\mu\text{g L}^{-1}$) for Pb, Cd and Zn ions respectively. Use of polymer immobilized GO in a column sort-out the problem of escape of toxic GO into the environment and under optimized SPE conditions, quantitative desorption of metal ion involves only 5.0 mL of 2M HCl instead of any carcinogenic organic solvents. These two factors make this method ecofriendly and green one. The method was further validated analyzing standard reference materials and recovery of the spiked analyte from real water samples.

Biography:

Dr. Suneel Kumar, he received his MSc in Analytical Chemistry in 2011 and Doctor of Philosophy in 2016 from Aligarh Muslim University (AMU) Aligarh, UP, India. Currently, he is associated with Indian Institute of Science Education and Research Bhopal (IISERB), Bhopal, MP, India as a National Postdoctoral Fellow. His research work focused on development of analytical method for toxic metal determination and their removal by solid phase extractant. He also working in the field of super capacitor for energy storage.