

Study Mercapto-Nanoscavenger as a Promising Analytical Tool

Authors : Mohammed M. Algaradah

Abstract : A chelating mercapto- nanoscavenger has been developed exploiting the high surface area of monodisperse nano-sized mesoporous silica. The nanoscavenger acts as a solid phase trace metal extractant whilst suspended as a quasi-stable sol in aqueous samples. This mode of extraction requires no external agitation as the particles move naturally through the sample by Brownian motion, convection and slow sedimentation. Careful size selection enables the nanoscavenger to be easily recovered together with the extracted analyte by conventional filtration or centrifugation. The research describes the successful attachment of chelator mercapto to ca. 136 ± 15 nm high surface area (BET surface area = $1006 \text{ m}^2 \text{ g}^{-1}$) mesoporous silica particles. The resulting material had a copper capacity of ca. $1.34 \pm 0.10 \text{ mmol g}^{-1}$ and was successfully applied to the collection of a trace element from water. Essentially complete recovery of Cu (II) has been achieved from freshwater samples giving typical preconcentration factors of 100 from $50 \mu\text{g/l}$ samples. Data obtained from a nanoscavenger-based extraction of copper from samples were not significantly different from those obtained by using a conventional colorimetric procedure employing complexation/solvent extraction.

Keywords : nano scavenger, mesoporous silica, trace metal, preconcentration

Conference Title : ICETTMERA 2022 : International Conference on Environmental Toxicology of Trace Metals and Environmental Risk Assessment

Conference Location : London, United Kingdom

Conference Dates : July 28-29, 2022