

Determination of Trace Metals in Salt by Use of Graphite Furnace Atomic Absorption Spectrometry with Gel Collection

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Summary

Various metal ions form complex anions with Chrome Azurol S (CAS). The ion pair of this metal complex anion with CAS and Zephiramine (benzyltrimethyltetradecyl-ammonium chloride) was quantitatively collected into the gel of poly(vinyl methyl ether) (PVME). Applying this phenomenon, trace metal ions in aqueous solution could be separated and concentrated into the PVME gel. The gelation of aqueous PVME solution was made by salting-out techniques. Mixture solution was centrifuged and the gel was separated from the bulk aqueous solution and dissolved into small amount of N,N-dimethylformamide (DMF). The metals in the DMF solution were determined by the graphite furnace atomic absorption spectrometry (GFAAS). Using this method, 100 times concentration of metal was established and good separation of metal ion from another metal ions were observed. This result shows that this collection by PVME gel is very useful for the pre-concentration for the GFAAS determination. Because alkaline and alkaline earth metal ions can not be collected in PVME gel, this GFAAS determination with gel collection was applied to determination of trace metals in halite, common salt, reagent sodium chloride and sea water. The method of standard addition was applied. After 50-100 times concentration, the ppb-level determination of metals in these samples could be successfully established.