

3736716 SCAI/M : MAJOR: APPLIED ANALYTICAL AND INORGANIC CHEMISTRY;
M.Sc. (APPLIED ANALYTICAL AND INORGANIC CHEMISTRY)
KEY WORDS : ADSORPTION/ ACTIVATED CARBON/ ATOMIC ABSORPTION
KHUANJIT BENYATIAN : DETERMINATION OF TRACE METALS BY
SLURRY-SAMPLING ELECTROTHERMAL ATOMIC ABSORPTION SPECTROMETRY
AFTER PRECONCENTRATION ON ACTIVATED CARBON. THESIS ADVISORS :
JUWADEE SHIOWATANA Ph.D., DUANGJAI NACAPRICHA Ph.D., 103 p.
ISBN 974-661-665-2

A rapid and simple preconcentration method by selective adsorption on activated carbon and slurry sampling electrothermal atomic absorption spectrometry (ETAAS) was developed for the determination of very low levels of heavy metals in sea water. Adsorption efficiency was enhanced by complexation of metals of interest with 8-hydroxyquinoline (oxine). Analytical grade commercial activated carbon was found to contain very low amount of Cd, Co, Hg and Ni, below or close to the detection limits. However, it produced high blank readings for Cr, Cu and Pb even after acid washing. Adsorption conditions of Cd, Co, Hg and Ni oxinate complexes on commercial activated carbon such as pH, concentration of oxine, contact time and amount of activated carbon were investigated in order to optimize the preconcentration procedure. Parameters affecting the ETAAS analysis by slurry sampling technique were studied. The proposed method was applied to the analysis of Cd, Co, Hg and Ni in seawater. The detection limits were 0.3 ppt, 6 ppt, 62 ppt and 5 ppt respectively and recoveries between 86-114% were obtained.

High purity activated carbon was prepared in-house from purified cane sugar solution by carbonization and steam activation to lower the Cr, Cu and Pb contents. Only Pb concentration could be lowered to an acceptable level while concentrations of Cr and Cu were still too high. The obtained sugar activated carbon was used as adsorbent and the results were compared to those of commercial activated carbon. For simultaneous preconcentration of five metals by adsorptive preconcentration, the detection limits of Cd, Co, Hg, Ni and Pb were 0.2 ppt, 5 ppt, 55 ppt, 5 ppt and 7 ppt respectively. The proposed method is considered to be suitable for the determination of trace amounts of Cd, Co, Hg, Ni and Pb in seawater with 86-104% recovery.