

C017364 : MAJOR NUCLEAR TECHNOLOGY

KEY WORD : ELEMENTAL ANALYSIS/X-RAY FLUORESCENCE/AIRBORNE PARTICULATES

UTAI TIYAWISUTSRI : ELEMENTAL ANALYSIS OF AIRBORNE PARTICULATES
USING X-RAY FLUORESCENCE TECHNIQUE. THESIS ADVISOR : ASSO. PROF.
TATCHAI SUMITRA, Dr. Ing. 154 pp. ISBN 974-581-624-8

Elemental analysis of airborne particulates by using x-ray fluorescence technique was studied by both Energy Dispersive (EDX) and Wavelength Dispersive (WDX) systems. WDX system was used to analyse trace elements such as Pb, Mn, Br, Ni, Zn, Fe, Ti, Cr, Cu and S. The detection limit of these elements on 9.621 square centimeter cellulose filter (Whatman No.41) were 0.22, 0.15, 0.14, 0.09, 0.10, 0.20, 0.21, 0.18, 0.09 and 2.10 μg respectively. Comparative results of the x-ray fluorescence and the ICP-AES and AAS were found to be acceptable values.

EDX system was chosen to analyse the major elements of airborne particulates. The peak-to-background ratio method was used to correct matrix effects of varied chemical composition of samples.

Additionally, scanning electron microscope with energy dispersive x-ray analyzer (ED-SEM) was used, in this work, to analyse the size, shape, and chemical composition of micro-particle in airborne particulates.

Field measurements were carried out in urban area (at Scientific and Technological Research Equipment Centre, Chulalongkorn University, Bangkok). Average chemical composition of airborne particulates in this area for major elements Al, Si, K, Ca, Fe and S were 6.32, 22.04, 1.80, 10.36, 1.82 and 4.17 % by weight respectively, and those for some trace elements Pb, Mn, Br, Ni, Zn, Ti and Cu were 2.084, 0.272, 0.512, 0.443, 3.635, 1.775 and 2.066 mg/g respectively. In Amphoe Sriracha Chon-buri province, the average chemical composition of airborne particulates for major elements Al, Si, K, Ca, Fe and S were 7.41, 32.18, 2.87, 2.72, 2.07 and 2.31 % by weight respectively, and those for some trace elements Pb, Mn, Br, Ni, Zn, Ti and Cu were 0.486, 0.551, 0.428, 0.523, 0.205, 2.944 and 0.604 mg/g respectively.