

Elemental Analysis of Aerosol Samples Collected from an Industrial and a Non-industrial Town of Punjab (India) using PIXE Technique

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Chemical composition of the aerosols is an important aspect of aerosol monitoring. The adverse effects on human health due to different elements in aerosols depend on their concentrations. A comparative study of aerosol concentration and composition from an industrial town Mandi-Gobindgarh and a nearby (25 km away) non-industrial and comparatively less polluted town Morinda, in state Punjab (India) was carried out. Aerosol samples were analyzed by Particle Induced X-ray Emission (PIXE) technique at the Institute of Physics, Bhubaneswar. Elemental concentrations were found to be much higher in Mandi-Gobindgarh as compared to Morinda. However, the large deviations from the mean concentrations, particularly in Mandi-Gobindgarh is suggestive of highly varying day to day industrial activity and changing weather conditions. Elements such as S, Br and Pb were found higher in the PM_{2.5} (particulate matter with = 2.5 μm aerodynamic diameter), which are related to burning of coal and oil in furnaces in Mandi-Gobindgarh. The elements related to natural dust such as K, Ca, Ti, Mn, and Fe are mainly distributed in PM_{cf} (particulate matter with aerodynamic diameter between 2.5 and 10 μm) fraction in both the towns. High concentrations of Ti, Cr, Mn, Fe and Zn in the PM_{cf} fraction from Mandi-Gobindgarh are likely due to the industrial activity of Steel rolling mills.

Key words: *Aerosols, elemental concentration, PIXE technique, and industrial town, India.*