

Elemental and Trace Element Analysis of PM_{2.5} Aerosols Collected From a Traffic Site in Sharjah, UAE Using XRF Technique

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Particulate matter (PM) samples were sampled at a traffic site, using a low volume sampler on Teflon 47 mm diameter filters. The sampling campaign ran over a one-year period with sampling frequency of twice a week for PM_{2.5}, the fine fraction of PM. Identifying trace elements in PM_{2.5}, is particularly important as they can be used as markers to identify various pollution sources. X-ray fluorescence (XRF) analysis was used to identify elemental constituents of filters collected between October 25, 2017 and October 26, 2018. Emphasis in this work is on trace elements that are common to certain pollutant sources. We have identified samples with high Pb, Zn, Cu, Ni, V, and Cr as markers for major anthropogenic sources of pollution. Quantitative analysis lead to the determination of elemental concentrations (in $\mu\text{g}/\text{m}^3$) for 22 elements. Statistical modeling was also applied to the XRF results, the total mass concentration on each filter and the amount of black carbon determined by absorption measurements. A receptor model (Positive Matrix Factorization method (PMF)) was applied to the data and the contributions of various sources were identified.