

5th International Conference on Green Chemistry and Technology

Daniellys Alejo Sánchez, Trends in Green chem, 3:2
DOI: 10.21767/2471-9889-C1-003

& 6th International Conference on Environmental Chemistry and Engineering

July 24-26, 2017 Rome, Italy

Chemical composition of PM10 collected at workplace atmosphere in an iron foundry

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In the last, the industrial sector has been revitalized in Cuba. Specifically, the metal-mechanical industry has been extensively used to produce parts for the sugar industry, iron and steel industry as well as other industries. Former iron and steel work sites are significant in terms of their degree of pollution. The aim of this research was to determine the elemental composition of PM10 and water soluble ions associated to this particle fraction at workplace atmosphere in an iron foundry. The PM10 was sampled by a low volume sampler and PM10 concentrations were collected using a filter paper. The sampling was made during the process of molding, unmolding, and casting of iron and non-working days. The samples collected were analyzed by the energy dispersive X-ray fluorescence technique. In the excitation, an X-ray tube of Gd operated at 6 mA/100 kV/1500 s, 8 mA/75 kV/1500 s and 17.1 mA/35 kV/840 s irradiated secondary targets of Mo, Ge and Ti respectively. The ionic species were analyzed by ion chromatography. The results show that the highest concentrations are for Na, Mg, Al Si, S, Cl, K Ca, Fe, Cu Zn, Sn and Pb. There are elements such as P, Ga, Ge, As, Se, Rb, Y, Zr, Cd, I, Cs and Ba whose concentration levels were below the limit of detection and the blank limit of detection during all processes. Thirteen ions were analyzed but, only Na⁺, Mg²⁺, Ca²⁺, Cl⁻, NO₃⁻, and SO₄²⁻ were found. The highest values were found during working days, although in some cases the levels are also high during non-working days.

Biography

Daniellys Alejo Sánchez has completed her PhD from Antwerp University. She is the Director of the RIP project "Characterization and analysis of particulate compounds in multiple workplace atmospheres" developed between the University of Antwerp and the Universidad Central "Marta Abreu" de las Villas. She has published some papers in reputed journals and has been serving as a reviewer of several papers.

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