Seminar

Institute for Plasma Research

Title : Study of Toxic Elements in Environmental Samples Collected from Industrial Area using Spectroscopic Techniques

Speaker : Dr. Rohit Kumar
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Date : 27th July 2015 (Monday)

Time : 03.30 PM

Venue : VC Room, IPR

Abstract:

Rapid industrial developments have increased the environmental pollution level particularly in the nearby areas of industrial activity. Due to lack of proper management of the industrial waste, it leads to contamination of soil and enters into the biosphere. Thus, it will affect the human health. In the present work, Jajmau area of the Kanpur city, India has been selected where a lot of industries are running. Different samples like water, soil, plant and industrial effluent were collected from the site and were analyzed to know the extent of pollutant in these samples using different spectroscopic technique.

Laser induced breakdown spectroscopy (LIBS) setup was designed for the identification of these elements. It was found that the amount of the Cr in these samples (seed, leaf and soils) is much higher than the EPA, FDA limits. Neutron activation analysis (NAA) and total x-ray florescence (TXRF) of samples were carried out at BARC. The results obtained from three spectroscopic techniques suggest that LIBS is suitable over other techniques for identification and quantification of toxic elements in the environmental sample as it provides online, in-situ analysis and it is field applicable.

Calibration-free laser-induced breakdown spectroscopy (CF-LIBS) technique is another approach which was used for the quantitative measurement of toxic elements in these samples. Chromium is usually present in surface and ground water in either trivalent (Cr (III)) or the hexavalent (Cr (VI)) oxidation state. Hexavalent is reported more toxic than trivalent so a biphasic method to separate the Cr (III) and Cr (VI) has been developed and quantification of both species of Cr was done using LIBS. Different parameters like pH, volume of solvent etc. in the extraction experiments was optimized using standard solutions of Cr (VI) and Cr (III). And LIBS has been utilized to get concentration of Cr (III) and Cr (VI) in the industrial waste sample.