PIXE Analysis of Atmospheric Aerosol Samples Collected in the Adirondack Mountains

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We have performed an elemental analysis of atmospheric aerosol samples collected at Piseco Lake in Upstate New York using proton induced x-ray emission spectroscopy (PIXE). This work is part of a systematic study of airborne pollution in the Adirondack Mountains. Of particular interest is the sulfur content that can contribute to acid rain, a well-documented problem in the Adirondacks. We used a nine-stage cascade impactor to collect the samples and distribute the particulate matter onto Kapton foils by particle size. The PIXE experiments were performed with 2.2-MeV proton beams from the 1.1-MV pelletron accelerator in the Union College Ion-Beam Analysis Laboratory. X-Ray energy spectra were measured with a silicon drift detector and analyzed with GUPIX software to determine the elemental concentrations of the aerosols. A broad range of elements from silicon to zinc were detected with significant sulfur concentrations measured for particulate matter between 0.25 and 0.5 μm in size. The PIXE analysis will be described and preliminary results will be presented.

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