

**Abstract**—A new experimental method for chemical *in situ* analysis of ambient aerosol particles is presented. Aerosol particles from the atmosphere with diameters  $> 1 \mu\text{m}$  were charged and subsequently captured in an electrodynamic balance. Raman scattering from the particles was excited with an argon ion laser. Raman spectra were taken with a CCD detector through a spectrograph and used to identify chemical substances in the particles. Test particles of sodium sulfate and diethyl sebacate (DES) were employed to determine the detection limit of the method and the size dependence of Raman scattering. The detection limit for sodium sulfate was 0.27 pg, corresponding to a particle diameter of 580 nm. The size-averaged Raman scattering was found to be approximately proportional to volume for particles with diameters  $> 500$  nm using excitation in the visible region. © 1998 Elsevier Science Ltd. All rights reserved