



A novel spectroscopic approach to characterizing the near-ultraviolet extinction coefficient of secondary organic aerosols

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The near-UV optical properties of aerosols have been experimentally neglected and remain poorly characterized, largely due to the limitations of current techniques for measuring the optical properties of aerosols at such short wavelengths. In this work, we demonstrate a novel broadband optical cavity spectrometer to measure the extinction coefficient of aerosols across the near-ultraviolet spectral region. The method is applied to investigate the spectral and temporal dependence of the extinction coefficient of secondary organic aerosol (SOA) formed from biogenic and anthropogenic precursors in a 4 m³ atmosphere simulation chamber. We present the spectral analysis procedure to retrieve the extinction coefficient of particles and evaluate the potential of the method to quantify particle absorption via the extinction-minus-scattering approach. The advantages and limitations of the spectrometer are discussed.