Photoinduced reactions of Anthraquinone-2-sulfonate towards aerosol constituents in tropospheric aqueous solution

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The formation of secondary organic aerosol (SOA) is centered on the traditional models on the absorption of semi-volatile organic into preexisting aerosols. However, the occurring aerosol aging is associated with chemical transformation by photooxidation chemistry within the particle. [1-4] Unfortunately, the radical sources driving this chemistry remain highly uncertain due to an incomplete understanding of interacting organics in the aerosol particles.

This study presents the results form Anthraquinone-2-sulfonate (AQS) acting as photosensitizer, including time-resolved absorbance spectra (λ = 300 – 700 nm) of the excited states, the reaction rate constant with molecular oxygen ($k_{298\ K}$ = (5.1 ± 1.1) × 10^8 L mol^{-1} s^{-1}) as well as other aerosol constituents. These results were obtained by using a laser flash photolysis-laser long path absorption (LFP-LLPA) setup. The product analysis of the photo-induced oxidation reaction of AQS, were done by several analytical techniques like UPLC-HRMS and GC-MS.

Literature:

[1] M. E. Monge, PNAS 2012, 109, 6840-6844. [2] K. Z. Aregahegn, Faraday Discuss. 2013, 165, 123-134. [3] S. Rossignol, Environ. Sci. Technol. 2014, 48, 3218-3227. [4] C. George, Chem. Rev. 2015, 115, 4218-4258.