ANTHRAQUINONE-2-SULFONATE AS A MODEL FOR PHOTOINDUCED REACTIONS IN TROPOSPHERIC AQUEOUS AEROSOL

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The uptake of semi-volatile organic compounds into preexisting particles is the main pathway of the secondary organic aerosol (SOA) formation in traditional models. However, studies by Monge et al. (2012), Aregahegn et al. (2013) and Rossignol et al. (2014) give hints that the chemical transformation processes occurring during aerosol aging are related to photosensitization reactions within the particles. Unfortunately, this chemistry remains highly uncertain because of an incomplete understanding of radical reactions and the mechanisms driving redox chemistry in aerosol particles. Within the present study, anthraquinone-2-sulfonate (AQS) is used as a model photosensitizer to understand the photochemical pathways in SOA formation using a laser flash photolysis-laser long path absorption setup. The time-resolved absorbance spectra (λ = 300–700 nm) of the excited states and the reaction rate constants with molecular oxygen [$k_{298\,K} = (5.1 \pm 1.1) \times 10^8$ L mol^{-1} s^{-1}] and other aerosol constituents, such as iron(III) sulfate, will be presented. Finally, product analysis of the photo-induced oxidation reactions involving AQS were carried out using several analytical techniques (e.g., GC-MS).

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