Investigation of SOA Composition from the Photolysis of 1-Nitronaphthalene using Single Particle Mass Spectrometry

Robert M. Healy [1] , Yang Chen [1] , Ivan Kourtchev [2] , Markus Kalberer [2] and John C. Wenger [1]
[1] Department of Chemistry and Environmental Research Institute, University College Cork
[2] Department of Chemistry, University of Cambridge

Nitro-substituted polycyclic aromatic hydrocarbons (nitro-PAHs) are associated with mutagenic and carcinogenic effects. 1-Nitronaphthalene is among the most abundant gas-phases in nitro-PAHs and is emitted from combustion processes like vehicle exhaust.

Photolysis reactions are known to have a major role in the degradation of 1-nitronaphthalene in the troposphere. In this study, the chemical composition of secondary organic aerosol formed from the photolysis reactions of 1-nitronaphthalene was investigated using an Aerosol Time-of-Flight Mass Spectrometer. A previously unreported reaction mechanism has been identified, elucidating a new pathway to secondary organic aerosol formation in the troposphere.