



Secondary organic aerosol formation during the gas phase photolysis of nitrophenols

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Aromatic hydrocarbons are an important class of VOCs emitted to the atmosphere mainly from anthropogenic sources. Nitrophenols as secondary oxidation products during the atmospheric degradation of BTX, play an important role in urban pollution. The formation of nitrophenols in the combustion processes occurring in motor vehicles has also been reported by Tremp et al. (1993) who found nitrophenols and nitrocresols in the exhaust gas emissions of car engines. The oxidation of nitrophenols, results in products, which are known to partition between the gas and particulate phases, with resultant formation of secondary organic aerosol (SOA). The identification of the products mainly responsible for the SOA formation is unknown. Recent studies in our laboratories have shown, that in addition to SOA formation, the gas phase photolysis of nitrophenols leads to HONO formation and subsequently OH radical formation. As part of a series of systematic studies on the atmospheric chemistry of nitrophenols, we present here results from observations of secondary organic aerosol formation during the irradiation of nitrophenols with actinic lamps (Philips TL 05/40 W: 320 - 480 nm and maximum at 360 nm) in a large volume quartz glass chamber. Since the photolysis is known to produce OH radicals, the influence of adding an OH scavenger on the SOA formation has been investigated as well as changes in the irradiation intensity. Possible atmospheric implications of the observations will be discussed.