

VOLATILITY MEASUREMENTS OF ORGANIC AEROSOLS USING A VTDMA SYSTEM

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A considerable fraction of air particulate matter is formed from oxidation of volatile organic compounds (VOCs). When oxidized the organic compounds are transformed via atmospheric radical and photochemical processes to less volatile compounds that can condensate or nucleate to form secondary organic aerosols (SOA). The biogenic contribution to VOCs producing SOA is on a global scale large where compounds such as isoprene and monoterpenes dominate.

The actual mechanistic pathways and low volatile products originating from oxidation of terpenes are not firmly established. However, a typical class of products from atmospheric oxidation processes yielding SOA is carboxylic acids, e.g. pinic and pinonic acids from α -pinene oxidation. The volatility of organic aerosols is an important property for gas to particle partitioning that originates from properties, such as vapour pressure, of its constituents and their concentration. To quantify the volatility of aerosol particles one can e.g. use a Volatility Tandem DMA system. This paper describes the initial tests and the performance of our newly developed VTDMA system. Main focus has been on studies of dicarboxylic acids with the general chemical formula of $\text{HOOC}(\text{CH}_2)_n\text{-2COOH}$ where n is the number of carbon atoms, which has been ranging from 4 to 10 in this study. The results is presented and discussed in relation to previous studies on vapour pressure determinations.

References:(Zhang, Seinfeld et al. 1993), (Jonsson, Hallquist et al. 2007)

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