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# Aerosol Chemistry Investigations by CHARON-PTR-ToF-MS

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Scientific progress in organic aerosol chemistry is still hampered by the lack of analytical methods that comprehensively and quantitatively characterize the organic composition of particulate matter in the atmosphere. Recently, the "Chemical Analysis of Aerosol Online" (CHARON) particle inlet has been introduced, enabling proton-transfer-reaction time-of-flight mass spectrometry (PTR-ToF-MS) instruments to characterize particulate-bound organics down to pg $m^{-3}$ levels. Herein, we will demonstrate the potential of the CHARON-PTR-ToF-MS for aerosol chemistry and physics studies. Based on results from experiments on 36 pure compounds we will show how qualitative (elemental composition) and quantitative analyses (mass concentrations) can be corrected for biases caused by analyte ion fragmentation in the PTR-ToF-MS analyzer. We will further show how bulk elemental ratios (O:C, H:C) of urban aerosol and monoterpene-derived SOA compare with parallel TOF-AMS measurements and reported literature values. We will also compare the volatility of monoterpene-derived SOA on a molecular level as directly measured in thermodenuder experiments and predicted from the 2D-volatility basis set using the CHARON-PTR-ToF-MS-derived chemical composition. The implications for the aerosol chemistry of monoterpene-derived SOA will be discussed.
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