



Development and Characterization of a High-Temperature Proton-Transfer-Reaction Mass Spectrometer (HT-PTR-MS)

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Research efforts are ongoing in many laboratories to develop instrumentation for near-real time analysis of specified aerosol organic compounds, including semi-volatile species. The Proton-Transfer-Reaction Mass Spectrometer (PTR-MS) may, in principle, be used for this purpose if semi- or non-volatile organic species can be prevented from adsorbing or condensing onto instrumental surfaces. We have developed a High-Temperature PTR-MS in which both the ion source and the ion drift tube can be continuously operated at temperatures up to 250 °C. The instrument was characterized in a high E/N-mode (130 Td) and in a low E/N-mode (87 Td) at an operating temperature of 200 °C. Instrumental sensitivities and 2-sigma detection limits were on the order of 50–110 cps/ppb and 100 ppt (1 s signal integration time), respectively. In addition, we have measured instrumental response times for a series of reference compounds. 1/e2-response times for levoglucosan, oxalic acid and cis-pinonic acid ranged from 8 to 370 s.