Geophysical Research Abstracts, Vol. 7, 07891, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07891

Chemical-ionisation processes in time-of-flight mass spectrometers for real-time analysis of atmospheric trace species.

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Proton transfer reaction mass spectrometry has become increasingly prominent since the 1990s and has a wide range of applications in analytical science. Essentially the technique relies on chemical ionisation *via* proton transfer from H_3O^+ to molecules with proton affinities greater than water. Coupling chemical ionisation to time-of-flight mass spectrometers has been demonstrated [Blake *et al*, *Anal.Chem.*, **76**, 3841-3845, 2004] to be a powerful technique for real time multichannel detection of trace species.

In this work, we will explore the use of differing chemi-ionisation reagents, in particular NO^+, which depending on the ionisation energy of the analyte will undertake charge transfer, for the ionisation of trace VOC/OVOCs. The ability for real-time speciation of a range of VOC/OVOCs using multi-chemi-ionisation reagents will be assessed.