

## P4

### REACTIONS OF C<sub>1</sub> – C<sub>15</sub> HYDROCARBONS WITH O<sub>2</sub><sup>+</sup> IN HIGH CONCENTRATION WATER ENVIRONMENTS

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The reactions of O<sub>2</sub><sup>+</sup> with C<sub>1</sub> – C<sub>6</sub> and C<sub>8</sub> hydrocarbons are well documented,<sup>1-5</sup> but these reactions are measured in simulated laboratory environments with very low levels of water vapour. With the recent development of SIFT-MS as an analytical technique for measuring concentrations of volatiles in the low ppb range,<sup>6</sup> 'GeoVOC' chemistry has become topical. GeoVOC (geological volatile organic compound) is a direct measurement of hydrocarbon vapour above soil samples. As the concentration of water vapour in the headspace of a GeoVOC sample greatly exceeds that of any hydrocarbon, reactions of primary hydrocarbon product ions with water become increasingly important.

Measurements have been performed on the a FA-SIFT-MS (Flowing Afterglow – Selected Ion Flow Tube – Mass Spectrometer) laboratory instrument to

- a) Determine the primary reaction rates and product branching ratios of O<sub>2</sub><sup>+</sup> with C<sub>7</sub> and C<sub>9</sub> – C<sub>15</sub> hydrocarbons;
- b) Elucidate the secondary ion chemistry of the hydrocarbon product ions with water.

As a direct outcome of these measurements, the overall product branching ratios for O<sub>2</sub><sup>+</sup> reacting with C<sub>1</sub> – C<sub>15</sub> hydrocarbons have been amended for the presence of water vapour.

#### References

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