



Measuring isoprene hydroxy hydroperoxides (ISOPOOH) and isoprene epoxydiols (IEPOX) with a novel SRI-ToF-MS

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The global emission rate of isoprene is estimated to be 540 Tg C per year. Hence, isoprene has an important impact on the oxidation capacity of the atmosphere. In low NO_x regions isoprene predominantly reacts with OH producing Isoprene hydroxy hydroperoxides (ISOPOOH) and isoprene epoxydiols (IEPOX). Recent experiments have shown that ISOPOOH converts on metal surfaces to methyl vinyl ketone and methacrolein, the isoprene oxidation products under high NO_x conditions. Therefore standard SRI-ToF-MS (Selective Reagent Ion – Time of Flight – Mass Spectrometer) instruments with metal drift tubes detect ISOPOOH as methyl vinyl ketone and methacrolein.

We have developed a novel SRI-ToF-MS prototype without metal surfaces in the drift tube. In NO^+ primary ion mode ISOPOOH can be detected as $\text{C}_5\text{H}_9\text{O}^+$. The new SRI-ToF-MS also uses NH_4^+ primary ions. This NH_4^+ mode enables detection of the isomers ISOPOOH and IEPOX without fragmentation.

Furthermore, we reveal more metal surface conversion products of the different ISOPOOH isomers. A C5-diol ($\text{C}_5\text{H}_{10}\text{O}_2$) and a C5-hydroxy carbonyl ($\text{C}_5\text{H}_8\text{O}_2$) are also products from ISOPOOH conversion on metal surfaces.