

2.155 Highly Oxidized Organic Molecules (HOMs) Formation in the NO₃-Initiated Oxidation of Isoprene, Limonene and β-Pinene.

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Abstract:

Isoprene and monoterpenes are two important classes of biogenic volatile organic compounds. Oxidation of isoprene and monoterpene by NO₃ radical have significant impact on VOC loss, ozone formation, and secondary organic aerosol formation. The oxidation mechanism of isoprene and monoterpene by NO₃ radical is still unclear. Particularly, the formation of highly oxidized organic molecules (HOMs) during the oxidation of isoprene and monoterpene by NO₃ radical has not been reported in the literature. In this study, we investigated the oxidation of isoprene, limonene, and β-pinene by NO₃ radical in SAPHIR chamber (Simulation of Atmospheric PHotochemistry In a large Reaction chamber) at Forschungszentrum Jülich, Germany. The experiments were conducted at ambient relevant VOC and NO₃ concentrations. HOMs were measured using a nitrate chemical ionization mass spectrometry (NO₃⁻-CIMS). HOMs monomer, dimer and trimer were detected. The mechanism of the HOMs formation was attempted. A series of

HOMs compounds can be explained by the NO_3 addition to double bonds forming RO_2 , followed by auto-oxidation. Different HOMs were found to show distinctive time profile during the oxidation.

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