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Unambiguous identification of esters as oligomers in secondary organic aerosol formed from cyclohexene and cyclohexene/α-pinene ozonolysis

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Abstract. The build-up of oligomeric compounds during secondary organic aerosol (SOA) formation is subject of atmospheric research since several years. New particle formation and especially the SOA mass yield might be influenced significantly by oligomer formation. However, the chemical nature of observed oligomers and their formation pathways are still unclear. In this paper, the structural characterization of certain dimeric compounds (esters) formed during the ozonolysis of cyclohexene and cyclohexene/α-pinene mixtures are presented. The identification is based on the comparison of the mass spectra and the retention times (LC) of the oligomeric products with synthesized reference compounds. Cyclohexene is used here as a model compound for terpenes as globally most important SOA precursors, since it possesses a simpler structure than the biogenic alkenes and therefore offers the possibility to get access to reference compounds for certain of its oxidation products. In addition to cyclohexene, the formation of esters could also be observed in experiments with α-pinene as reactant.

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