



Chamber studies on the viability of $\delta^{13}\text{C}$ measurements in biogenic SOA formation

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Atmospheric aerosols impact the global radiation budget, the hydrologic cycle and human health. The organic aerosol component which is composed of numerous species with a variety of functionalities poses a big challenge in determining aerosol sources and physical properties. Volatile organic compounds (VOC) emitted from plants are one source for secondary organic aerosols (SOA). Recently it was shown that concurrent measurements of the mixing ratio and $\delta^{13}\text{C}$ values of atmospheric VOCs can provide information on the extent of chemical processing these VOCs have undergone in the troposphere. As an extension to this approach we combine the measurement of gas phase and particulate phase $\delta^{13}\text{C}$ values.

We will present results from experiments on the formation of SOA from the ozonolysis of β -pinene which were performed in the Jülich Large Aerosol Chamber. A custom built instrumentation for investigations of the stable carbon isotope ratios of selected VOCs which combines a cryofocussing system, 2-D chromatography and isotope ratio mass spectrometry is used for measurements of gas phase and particulate phase $\delta^{13}\text{C}$ values. Gas phase samples were collected in Silcosteel-canisters, particles were sampled on Teflon filters. The precursor β -pinene $\delta^{13}\text{C}$ value was measured and compared with the $\delta^{13}\text{C}$ values of reaction products. Nopinone was found in both the gas and particulate phase with $\delta^{13}\text{C}$ values being smaller than from the β -pinene. The nopinone $\delta^{13}\text{C}$ value for the particulate phase was found to be lower than the corresponding gas phase value. In addition acetone with an ever lower $\delta^{13}\text{C}$ value was found from the filter samples.

The general viability of the combined measurements of $\delta^{13}\text{C}$ in gas phase and partic-

ulate phase atmospheric samples for source apportionment and studies of the extent of chemical processing in the atmosphere will be discussed.