



## **Formation of Secondary Organic Aerosol from Non-traditional Intermediate Volatility Organic Compounds**

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Secondary organic aerosol (SOA) formation from ‘traditional’ precursors such as monoterpenes and alkylbenzenes has received substantial attention for the past decade. These traditional sources have relatively high emissions into the atmosphere, but they are also relatively volatile. As a consequence, the oxidation products from those precursors must be more than one million times less volatile in order to form SOA. We have recently begun to investigate the role of ‘nontraditional’ SOA precursors with much lower volatility than the traditional precursors. These intermediate volatility organic compounds (IVOC) are typically co-emitted with traditional primary organic aerosol (POA) sources at elevated temperatures, including biomass burning and internal combustion processes. While their emissions are much lower than the traditional precursors, the volatility reduction required of the reaction products is much less drastic, making high-yield SOA formation much more likely.

Here we describe the formation of SOA from two precursors in the CMU environmental chamber – heptadecane and pentacosane – under high- and low- $\text{NO}_x$  conditions. Analysis of the resulting SOA with a high-resolution aerosol mass spectrometer coupled to a thermodenuder allows us to assess the oxidation state and volatility distribution of the condensable products, revealing a high degree of oxidation under high- $\text{NO}_x$  conditions where most of the organics remain in the vapor phase for at least 2 generations of oxidation chemistry, but a lower (though progressive) degree of oxidation under other conditions. These results will be placed in context using a two-dimensional volatility basis set that incorporates both the volatility distribution and oxidation state of complex organic mixtures.