2.002 Interfacial Criegee Chemistry in the Atmosphere.

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Abstract:

Criegee intermediates (CIs) in the Atmosphere play fundamental roles in the HOx cycles and new particle formations. The roles of CIs at the gas-particle interface, however, remain to be poorly understood. Here, we report the mass spectrometric study on the mechanisms of reactions of CIs with a series of atmospherically relevant compounds including carboxylic acids, alcohols, saccharides and water molecules on model surfaces of organic aqueous aerosol particles. CIs generated from prompt ozonolysis of beta-caryophyllene or alpha-humulene on the liquid surface preferentially react with surface-active and acidic species (e.g., *cis*-pinonic acid) to form larger mass, less volatile products. Unexpectedly, levoglucosan and other saccharides, major components of ambient biomass burning particles**,** very rapidly react with CIs at the gas-liquid interface. We infer that large gas-phase acidities of the multiple OH-groups of saccharides underlie their exceptionally large reactivities toward CIs. We also investigate how micro-heterogenous surface of internally mixed media (e.g., water/organics) influences on the CI chemistry. Based on these new findings, the atmospheric roles of interfacial CI chemistry will be discussed.