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Mechanism for the atmospheric photooxidations of vinyl ether

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Oxygenated volatile organic compounds are ubiquitous in the atmosphere and play a central role in the chemical processes that determine the oxidizing capacity of the atmosphere. It is thought that oxygenated organics also make a significant contribution to the organic fraction of atmospheric aerosols.

Vinyl ethers ($ROCH=CH_2$) are a class of compound released to the atmosphere entirely from anthropogenic sources. These ethers find wide application in industry as oxygenated solvents, additives and in different types of coatings. To date studies on the atmospheric chemistry of vinyl ethers have not been very extensive.

In order to increase the atmospheric chemistry database for vinyl ethers, we report a product study on the OH and NO_3 radical and ozone initiated oxidation of propyl vinyl ether (PVE). All the experiments have been conducted in a 405 liter borosilicate glass chamber in synthetic air at (298±3) K using long path *in situ* FTIR spectroscopy for the analysis of the reactants and products. Simple atmospheric degradation mechanisms are postulated to explain the formation of the observed products. The information for the atmospheric photooxidation of PVE will allow a better assessment of the potential environmental impacts of not only PVE but also of other analogous vinyl ethers.