

Effect of Water in Ozonolysis of Limonene Studied by VUV Photoelectron Spectroscopy

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Abstract

Limonene, a cyclic monoterpene is the major component in citrus fruit peel oils. Besides its biogenic source, limonene has been commonly used in the indoor detergents or cosmetic products. Upon reactions with ozone, they contribute greatly to the formation of indoor secondary organic aerosols (SOA), which may greatly impair the indoor air quality and exhibit adverse health effects. Recent studies have shown that water exhibit a significant effect on the yield and products of limonene. To better understand the SOA formed via ozonolysis of limonene and the effect of water, we recently applied the aerosol VUV photoelectron spectroscopy as the major experimental investigation tool, employing the undulator-based VUV radiation (BL21B2, NSRRC) as the photoionization source to study the molecular orbital characteristics and ionization energies of R- and S-limonene upon reacting with varying levels of ozone under different relative humidity.

Keywords – *Aerosol VUV photoelectron spectroscopy, Limonene, Ozone, Secondary organic aerosols.*