

## Effects of relative humidity on tetrol formation from isoprene/NO photo-oxidation

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2-Methyltetrols, molecular markers of isoprene secondary aerosol, are produced by the particle-phase hydrolysis of organonitrate esters (Sato, 2008; Szmigielski *et al.*, 2010; Jacobs *et al.*, 2014) and/or the particle-phase oxidation of isoprene epoxydiols (Jacobs *et al.*, 2014) during the isoprene/NO<sub>x</sub> photo-oxidation. The effects of relative humidity, acid and base on 2-methyltetrol formation from the isoprene/NO photo-oxidation were investigated. We used a 6-m<sup>3</sup> Teflon bag and a 6-m<sup>3</sup> stainless steel chamber for humid and dry conditions, respectively. 2-Methyltetrol formation under humid conditions (RH  $\simeq$  80%) was enhanced in the presence of sulfur dioxide and was also enhanced in the presence of ammonia. In contrast, 2-methyltetrol formation under dry conditions (RH < 1%) was less catalyzed or suppressed in the presence of sulfur dioxide. The ratio of total 2-methyltetrol mass to total organic aerosol mass was 0.21 – 18 wt% under various present conditions. 2-Methyltetrol formation in the aqueous solution of aerosol sample was also investigated, and was found to be enhanced by both the acid and the base. The present results show that the presence of water is critical for acid-catalyzed 2-methyltetrol formation from isoprene/NO photo-oxidation. The ester hydrolysis will be a major pathway for 2-methyltetrol formation because it was enhanced by the base.

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