Secondary Organic Aerosol formation from the gas-phase reaction of catechol with ozone

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The formation of secondary organic aerosol from the gas-phase reaction of catechol (1,2-dihydroxybenzene) with ozone has been studied in two smog chambers (at the LPCA in France and at the CRAC in Ireland).

Aerosol production was monitored using a scanning mobility particle sizer. The overall organic aerosol yield (Y) was determined as the ratio of the suspended aerosol mass corrected for wall losses (Mo) to the total reacted catechol concentrations, assuming a particle density of 1.4 g cm-3. Analysis of the data clearly shows that Y is a strong function of Mo and that secondary organic aerosol formation can be expressed by a one-product gas/particle partitioning absorption model. The aerosol formation is affected by the initial catechol concentration, which leads to aerosol yields ranging from 17% to 86%.

The aerosol yields determined in the LPCA and CRAC smog chambers were comparable and were also in accordance with those determined in a previous study performed in EUPHORE (EUropean PHOto REactor, Spain).