Aerosol formation from the ozonolysis of α-pinene derivatives

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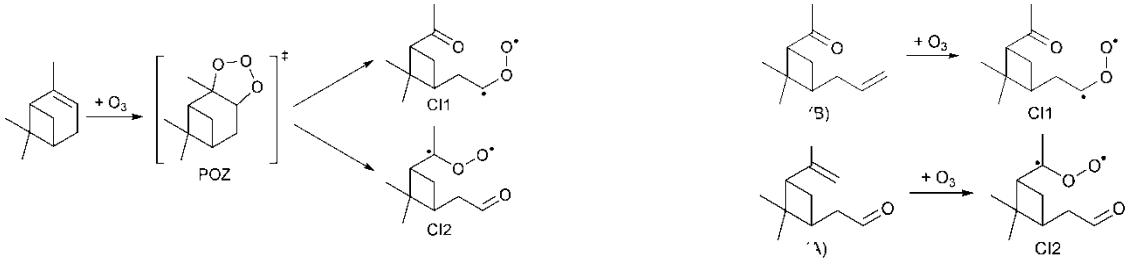
The reactions of ozone with terpenes are known to be important sources of secondary organic aerosol (SOA) in the atmosphere.[2] Consequently, there have been many studies of such systems, examining the chemistry of the wide range of oxidised products the reactions generate and the size distribution the particles created. However, the mechanisms of the reactions are complex and there are many unanswered questions about the reaction mechanisms and the details of the processes leading to aerosol nucleation and growth. In previous studies,[2] we have examined the chemistry of α-pinene ozonolysis by investigating the chemistry of derivatives (enone and enal) that can lead specifically to one or other of the Criegee intermediates generated in the ozonolysis of α-pinene.

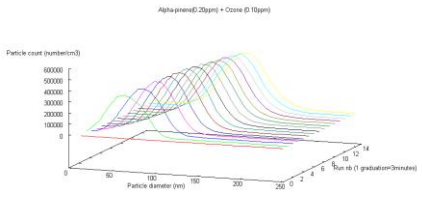


We have now extended this work by analysing the size distribution of particles generated in the reactions of ozone with α-pinene and the enone and enal derivatives using a static chamber coupled to a Scanning Mobility Particle Sizer instrument.

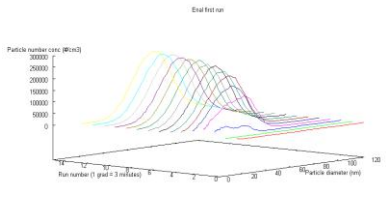
Very marked differences are observed. The aerosol generated by ozonolysis of α-pinene and the enal give qualitatively similar results, while ozonolysis of the enone gives a very much reduced yield of aerosol, as illustrated. The results are discussed in terms of previously determined underlying chemistry[2] and the implications for atmospheric chemistry.

References

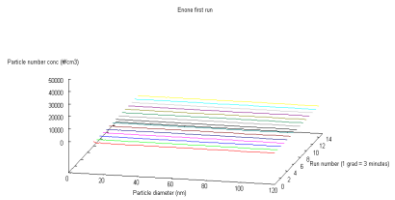
(1) Johnson, D. and Marston, G. *Chem. Soc. Rev.*, **2008**, 37, 699 – 716.
(2) Y. Ma, A.T. Russell and G. Marston *Phys. Chem. Chem. Phys.*, **2008**, 10, 4294 – 4312.



α-pinene ozonlysis



Enal ozonolysis



Enone ozonolysis

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