

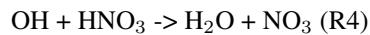
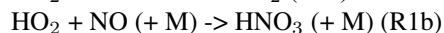


## Laboratory studies of key gas-phase $\text{HO}_x$ - $\text{NO}_x$ coupling reactions.

Terry J. Dillon (1), Katrin Dulitz (2), and John N. Crowley (1)

(1) Max Planck Institute for Chemistry, Mainz, Germany (terry.dillon@mpic.de), (2) now at Physical & Theoretical Chemistry Laboratory, University of Oxford, UK

The  $\text{HO}_x$  (OH &  $\text{HO}_2$ ) and  $\text{NO}_x$  (NO &  $\text{NO}_2$ ) families of atmospheric radicals are coupled via a number of gas-phase reactions. These reactions have a substantial impact by controlling radical propagation / termination in catalytic cycles, so modifying the oxidation power of the atmosphere and its rate of  $\text{O}_3$  production. However, field measurements {1-3} have demonstrated that our understanding of  $\text{HO}_x$  -  $\text{NO}_x$  chemistry is incomplete. We have identified four reactions (R1-R4) where the database is particularly unsatisfactory, leading to large uncertainties in atmospheric models {4-5}.



In this experimental work, laser-based kinetic and spectroscopic tools were used to investigate recent observations {6-7} of  $\text{HNO}_3$  formation from the (otherwise radical propagating)  $\text{HO}_2 + \text{NO}$  (R1), and OH formation following absorption of abundant, long wavelength photons by  $\text{NO}_2$  {8} and  $\text{NO}_3$  in the presence of water vapour (R2, R3). Uncertainties {9} associated with a classical  $\text{HO}_x$ - $\text{NO}_x$  coupling reaction (R4) were also addressed. Critical photochemical parameters so derived have included absolute rate coefficients for (R1) and (R4) and product yields (R1b, R2b, R3b). The atmospheric implications of these results will be discussed.

### References:

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