

# Two photon excited fragment spectroscopy (TPEFS) for HNO<sub>3</sub> detection in kinetic experiments

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The reaction of NO with HO<sub>2</sub> radicals plays a central role in atmospheric chemistry by regenerating OH radicals



In addition to the main reaction channel, a minor channel, forming HNO<sub>3</sub>, has been reported<sup>1</sup>.



This channel acts as a radical termination reaction, removing significant amounts of both HO<sub>x</sub> and NO<sub>x</sub> from the troposphere and modelling shows that the concentrations of several important atmospheric radicals is very sensitive to the yield of reaction (2) and accurate determination of the yield is therefore essential<sup>2</sup>.

We have developed and tested two photon, excited fragment spectroscopy (TPEFS) for detecting HNO<sub>3</sub> in pulsed laser photolysis kinetic experiments. Dispersed and single wavelength fluorescence emission following the 193 nm photolysis of HNO<sub>3</sub> have been recorded and analysed, and potential interferences from NO and NO<sub>2</sub> evaluated. The technique was validated by monitoring HNO<sub>3</sub> formation in reaction of OH + NO<sub>2</sub>. Results from method validation are presented along with recent advances on the HO<sub>2</sub> + NO reaction.

## References

(1) Butkovskaya, N. I.; Kukui, A.; Pouvesle, N.; Le Bras, G. *J. Phys. Chem. A* **2005**, *109*, 6509-6520.

(2) Cariolle, D.; Evans, M. J.; Chipperfield, M. P.; Butkovskaya, N. I.; Kukui, A.; Le Bras, G. *Atmos. Chem. Phys.* **2008**, *8*, 4061.