2.015 Molecular investigation of bromide reaction on sea-spray aerosol proxy: temperature dependence and the effect of organics .

Early Career Scientist

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Abstract:

Tropospheric ozone reaction with halides has important implications on the oxidation capacity of and the fate of compounds in the atmosphere. Recent studies show that sea-spray aerosols, which contain both organic and organic species, may be significant in this halogen/ozone budget [1]. Recent studies have also highlighted the possibility of a significant surface processes in bromide oxidation on aerosol proxies and salt solutions at environmentally relevant ozone concentrations. The presence of a surface process was recently observed in our kinetic study coupled with a liquid jet experiment presented in Artiglia et al.'s paper on the ozonide in bromide oxidation [2]. The liquid jet XPS aspect of the study showed the presence of Br•OOO complex as a surface intermediate driving the surface process [2].
Here, we tackle the question of the effect of organics on bromide oxidation in an aerosol proxy applying and extending the parameterization in Artiglia et al.'s paper. This is a first application of this parameterization, with modifications, to a wider temperature range, and including an organic species, citric acid, in this case. We apply this parameterization to evaluate the contribution of the surface and bulk processes to the observed uptake of ozone in the mixture. Our results indicate that the temperature and the composition of the mixture have effects on the solubility, diffusivity, and hence the uptake of ozone. These results show the importance of accounting for the aerosol composition in assessing the contribution of sea-spray aerosols in tropospheric halogen/ozone budget.
References:
1. Long, M.S., et al., Atmospheric Chemistry and Physics, 2014. **14**(7): p. 3397-3425.
2. Artiglia, L., et al., Nat Comm, 2017. **8**(1): p. 700.