

## Institutsseminar

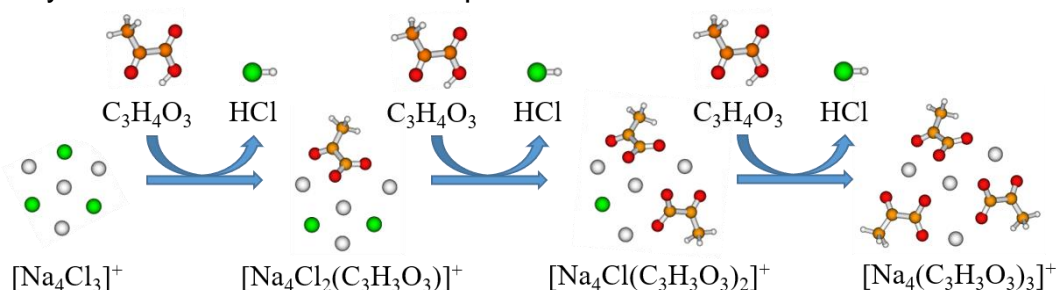
# Reactivity of Sea Salt Aerosols with Atmospherically Relevant Acids in the Gas Phase

**Jessica C. Hartmann, M.Sc.**

**Department of Ion Physics and Applied Physics  
University of Innsbruck - Austria**

As one of the most impactful aerosols in Earth's atmosphere, sea salt aerosols play a significant role in climate processes. Sodium chloride, their main component, is involved in numerous atmospheric processes, including chemical reactions with atmospherically relevant trace gases. These reactions are simulated in our experiments.

We use electrospray ionization (ESI) to produce gas-phase sodium chloride cluster ions. Atmospherically relevant acids, e.g. formic and pyruvic acid, are introduced as reaction gas into the ICR cell of a Fourier transform ion cyclotron resonance mass spectrometer (FT-ICR MS) and reaction kinetics are recorded. We observe a sequential acid uptake by both anions and cations, accompanied by HCl release (Figure 1). These results coincide with the observed reactions of sea salt aerosols with sulfuric or nitric acid in both atmospheric conditions [1] and laboratory studies [2]. We find a reactivity dependence on the proton affinity of the acids conjugate base. Furthermore, magic cluster sizes identified in prior studies [3] show a reduced reactivity for each acid used in our experiments.



**Figure 1:** Observed reaction of  $[\text{Na}_4\text{Cl}_3]^+$  with pyruvic acid.

Literature:

[1] R. von Glasow, Nature Geosci. 2008, 1, 292–293.

[2] M. J. Rossi, Chem. Rev. 2003, 103, 4823–4882.

[3] T. D. Schachel, H. Metwally, V. Popa, L. Konermann, J. Am. Soc. Mass Spectrom. 2016, 27, 1846–1854.