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IDENTIFICATION OF ICE NUCLEATION ACTIVE SITES ON FELDSPAR DUST PARTICLES

Tobias Zolles (1), Julia Burkart (1,2), Thomas Häusler (1), Bernhard Pummer (1,3), Regina Hitzenberger (4), Hinrich Grothe (1)*

(1) Vienna University of Technology, Institute of Materials Chemistry, Vienna, Austria, (2) University of Toronto, Chemistry Department, Toronto, Canada, (3) Max-Planck-Institute for Chemistry, Dept. Multiphase Chemistry, Mainz, Germany, (4) University of Vienna, Faculty of Physics, Aerosol Physics and Environmental Physics, Vienna, Austria

Mineral dusts originating from Earth's crust are known to be important atmospheric ice nuclei. In agreement with earlier studies, feldspar was found as the most active of the tested natural mineral dusts. Here we investigated in closer detail the reasons for its activity and the difference in the activity of the different feldspars. Conclusions are drawn from scanning electron microscopy, X-ray powder diffraction, infrared spectroscopy, and oil-immersion freezing experiments. K-feldspar showed by far the highest ice nucleation activity. Finally, we give a potential explanation of this effect, finding alkali-metal ions having different hydration shells and thus an influence on the ice nucleation activity of feldspar surfaces.

[1] Zolles T., Burkart J., Häusler T., Pummer B., Hitzenberger R., Grothe H. (2015). Identification of Ice Nucleation Active Sites on Feldspar Dust Particles. J. Phys. Chem. A 119, 2692-2700.