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Comment on acp-2021-806

Anonymous Referee #2

Referee comment on "The impact of (bio-)organic substances on the ice nucleation activity of the K-feldspar microcline in aqueous solutions" by Kristian Klumpp et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-806-RC2, 2021

Review of "the impact of (bio-) organic substances on the ice nucleation activity of the K-feldspar microcline in aqueous solutions" by Klumpp et al.

The authors used differential scanning calorimetry to investigate the ice-nucleating ability of K-feldspar in the presence of atmospherically relevant solutes, including carboxylic acids, amino acids, and polyols. Experiments were carried out as a function of solute concentration and exposure time. The effect of neutralization and washing of the K-feldspar after exposure was also studied to determine the importance of acid dissolution, anion binding, and adsorption. The results are convincing and the studies improve our understanding of the effect of solutes on ice nucleation by K-feldspar, an important atmospheric ice nucleus. The paper is well written, and as a result, I only have a few minor comments.

Minor comments:

- Section 2.3 the authors discuss experiments involving the neutralization of carboxylic acid solutions with ammonia. It was not clear at which stage the neutralization was carried out. Did they neutralize the acids before combining the acids with feldspar or after combining? Also, why did the authors neutralize with aqueous ammonia rather than use ammonium salts?
- Page 9, line 280. "Figure 5a shows no significant change of Thet and Fhet over seven days when microcline is suspended in pure water". I think it would be worth mentioning at this point that although Thet and Fhet were not significantly different, there was a clear change in the shape of the thermograms with the maximum of the heterogeneous freezing peaks shifting to lower temperatures.
- Page 11, line 315. "the interaction of these molecules with the microcline surface must be very similar to the ones of water molecules, namely fast dynamic exchange of molecules at the microcline surface corresponding to the case shown in Fig. 1a." I think this statement would be more accurate if the authors replaced "microcline surface" with

"ice-nucleating sites on the microcline surface" or something similar since their experiments are only sensitive to ice-nucleating sites, not the entire surface.