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The impact of carboxylic acids on ice nucleation

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Ice nucleation is a process which is not fully understood yet. Especially the influence of carboxylic acids has to be investigated. As shown by Pratt et al.[1] carboxylic acids are present in the troposphere and their influence on cloud formation is still unknown. Recent studies showed that pure soot aerosol is unable to nucleate ice and citric acid suppresses the nucleation to a certain extent in laboratory models.[2], [3] Therefore it is consequent to further investigate organic acids with different molecular masses and functional groups.
Starting with oxalic acid as the smallest carboxylic acid, several other carboxylic acids with different molecular masses and functional groups have been investigated. Every sample has been observed by ESEM, XRD and optical Microscopy. The same preparation procedure has been applied to all samples to gain comparable results and reveal trends on nucleation abilities.

[1] Pratt et al. “In situ detection of biological particles in cloud ice-crystals” Nature Geoscience, 2, 398-401, 2009
[2] O.Möhler et al., Meteorol.Z.14, 477, 2005
[3] B.J. Murray “Inhibition of ice crystallization in highly viscous aqueous organic acid droplets.” Atmos.Chem.Phys., 8, 5423-5433, 2008