

## Supporting information to “Heterogeneous freezing of droplets with immersed mineral dust particles - measurements and parameterization”

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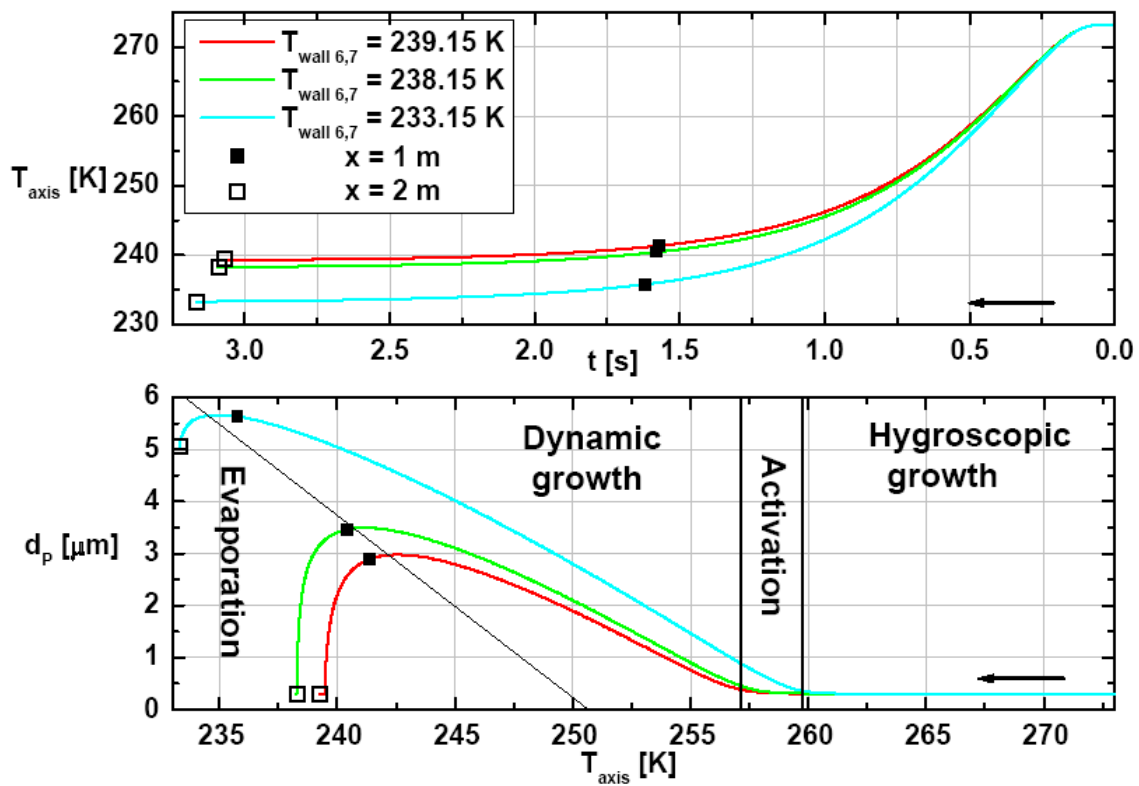
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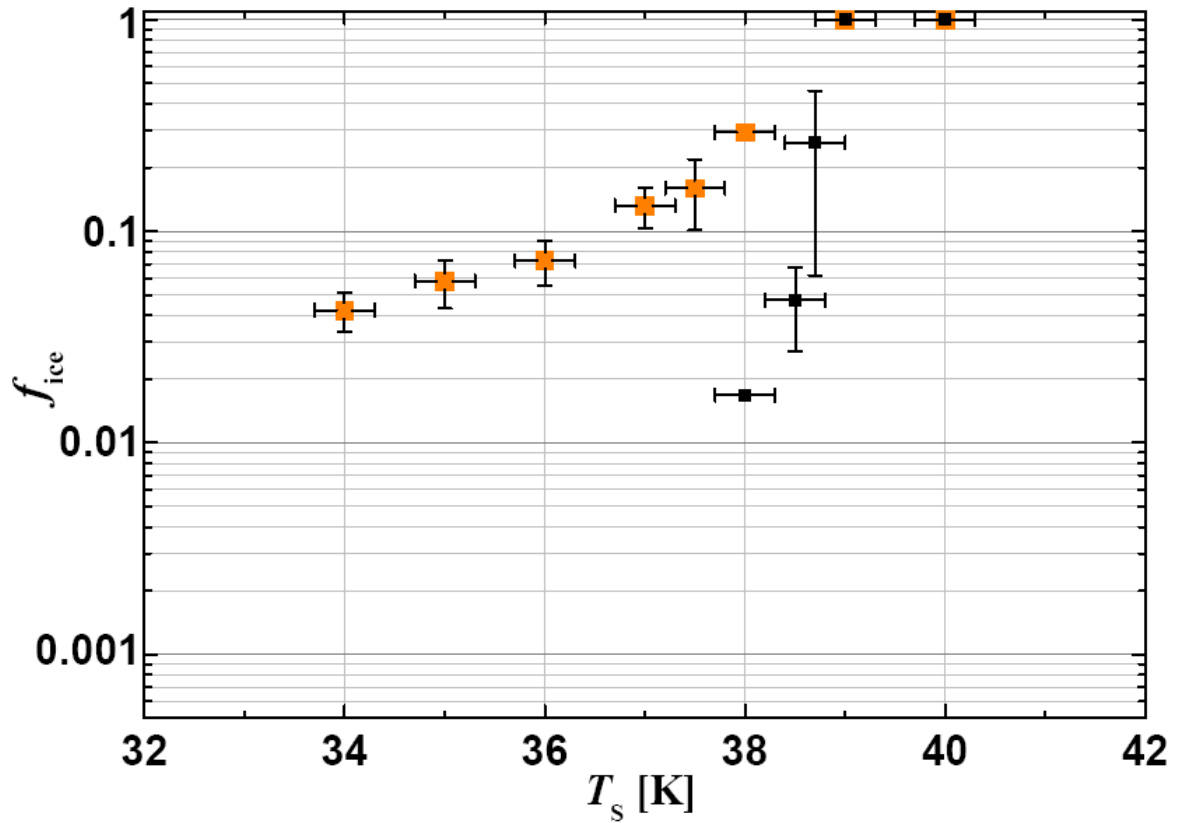
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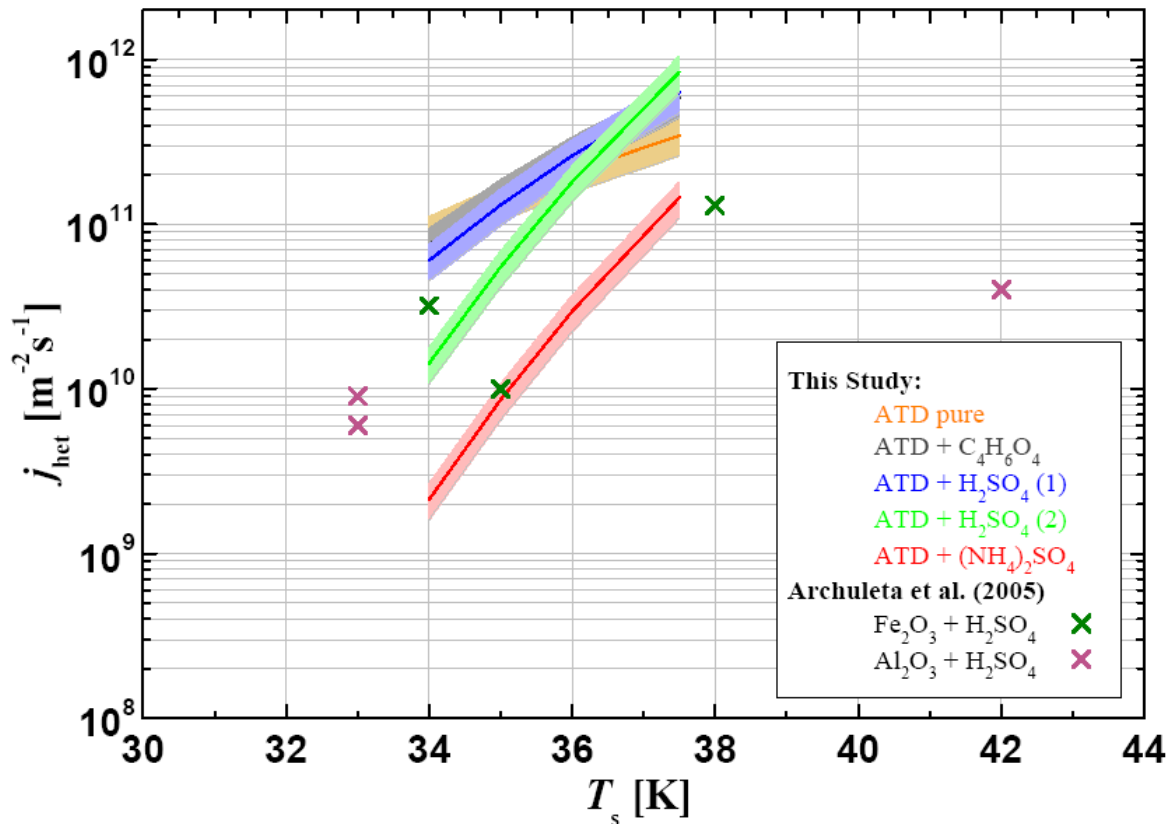
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**Fig. 3:** Both panels: FLUENT/FPM model simulations for three different wall temperatures 233.15 K, 238.15 K and 239.15 K). The black and the open square represent the end of the first and second freezing section. The curves are traced from right to left as particles cool monotonically while moving along the axis of the LACIS flow tube. *Upper panel:* Simulations of the axial temperature profile the particle beam is exposed to as function of residence time inside LACIS. *Lower Panel:* Simulations of the droplet growth behavior inside the two freezing sections.  $T_{\text{axis}}$  is the temperature which the particles experience in the particle beam.



**Fig. 6:** Ice fraction  $f_{ice}$  derived for pure ATD particles at different  $T_s$  (orange squares) and for homogeneous freezing of highly diluted ammonium sulfate droplets (black squares).



**Fig. 10:** Nucleation rates  $j_{het}$  for all types of particles. For the determination of  $j_{het}$ , the values for  $a$  and  $f_{het}$  are inserted into Eq. (8) and all types of IN are assumed to be spherical with a volume equivalent diameter of 300 nm. The crosses represent nucleation rates for sulfuric acid coated iron and aluminium oxide particles determined by Archuleta et al. (2005).

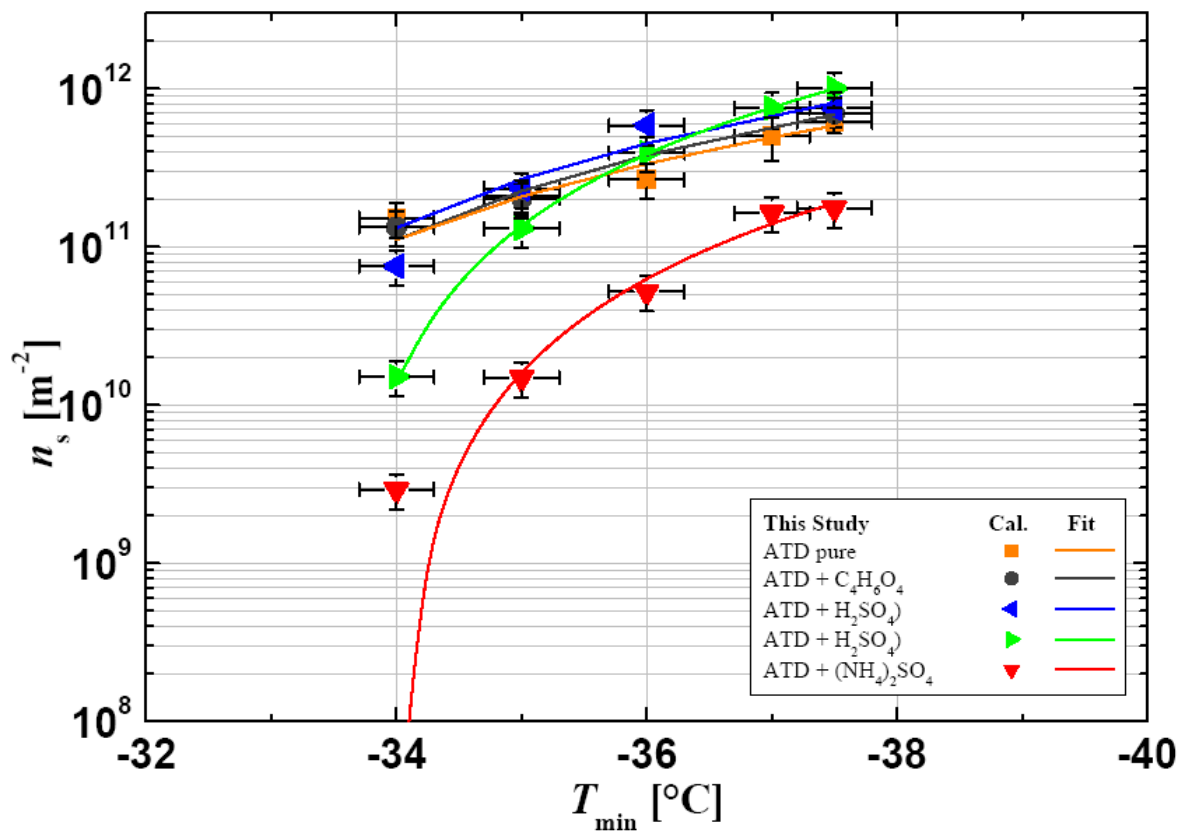


Fig. 11: Derived values for  $n_s(T)$  from the measurements as well as curves resulting from parameterization (see Eq. (12)) as function of temperature [°C].