

Supplement of Atmos. Chem. Phys., 16, 6495–6509, 2016
<http://www.atmos-chem-phys.net/16/6495/2016/>
doi:10.5194/acp-16-6495-2016-supplement
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Atmospheric
Chemistry
and Physics
Open Access
EGU

Supplement of

Heterogeneous ice nucleation of viscous secondary organic aerosol produced from ozonolysis of α -pinene

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Table S1. The viscous α -pinene SOA ice nucleation onset conditions for frozen fractions of 1 %, 5 % and 10 %. The columns from left to right list the date and the SPIN experiment number, the frozen (activated) fraction f_{ice} , the ice nucleation onset temperature, the minimum modelled saturation ratio with respect to water in SPIN (S_w min), the maximum modelled saturation ratio with respect to water in SPIN (S_w max), the minimum modelled saturation ratio with respect to ice in SPIN (S_{ice} min), and the maximum modelled saturation ratio with respect to ice in SPIN (S_{ice} max).

Date, Exp	f_{ice} (%)	Temperature ($^{\circ}$ C)	S_w min	S_w max	S_{ice} min	S_{ice} max
25 Oct, 1	1	-38.2	0.87	0.95	1.26	1.38
25 Oct, 1	5	-38.3	0.88	0.97	1.27	1.40
25 Oct, 1	10	-38.2	0.89	0.98	1.29	1.42
26 Oct, 1	1	-39.0	0.85	0.91	1.24	1.33
26 Oct, 1	5	-39.0	0.85	0.91	1.24	1.33
26 Oct, 1	10	-39.0	0.85	0.92	1.24	1.34
26 Oct, 2	1	-38.8	0.85	0.92	1.24	1.34
26 Oct, 2	5	-38.8	0.86	0.93	1.25	1.35
26 Oct, 2	10	-38.8	0.86	0.93	1.26	1.36
26 Oct, 3	1	-37.2	0.86	0.91	1.23	1.31
26 Oct, 3	5	-37.2	0.86	0.92	1.23	1.32
26 Oct, 3	10	-37.2	0.86	0.92	1.23	1.32
27 Oct, 1	1	-38.1	0.86	0.93	1.24	1.35
27 Oct, 1	5	-38.1	0.86	0.94	1.25	1.36
27 Oct, 1	10	-38.2	0.86	0.94	1.25	1.37
28 Oct, 1	1	-39.0	0.84	0.90	1.23	1.31
28 Oct, 1	5	-38.5	0.85	0.95	1.23	1.39
28 Oct, 1	10	-38.5	0.86	0.95	1.24	1.38
28 Oct, 2	1	-38.7	0.87	0.95	1.26	1.38
28 Oct, 2	5	-38.6	0.88	0.95	1.27	1.38
28 Oct, 2	10	-38.6	0.88	0.95	1.28	1.38
29 Oct, 1	1	-38.5	0.89	0.98	1.29	1.42
29 Oct, 1	5	-38.5	0.89	0.98	1.29	1.42
29 Oct, 1	10	-	-	-	-	-

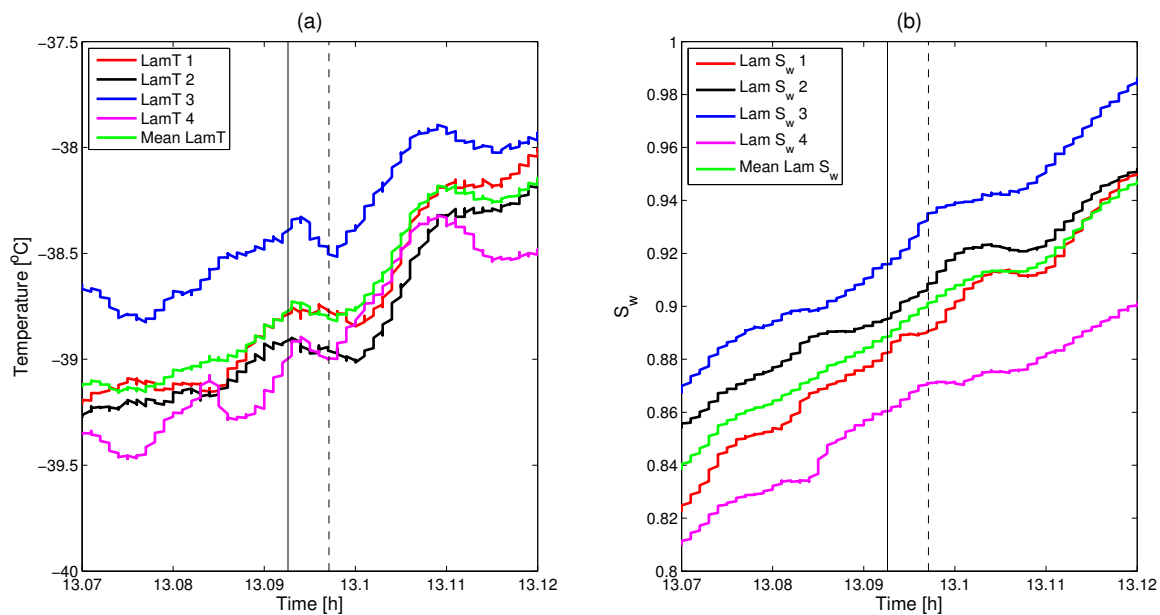


Figure S1. Aerosol lamina temperatures and maximum modelled water saturation ratios (S_w) during the ice nucleation onset of 550 nm SOA particles depicted in Fig. 3. In panel (a), the aerosol lamina temperatures at 4 locations inside SPIN are plotted. The lamina temperatures are calculated according to the modelling of the buoyancy effect by Rogers (1988), from the temperature readings monitored at 4 thermocouple locations on the SPIN chamber walls. The numbers 1 to 4 denote the different thermocouple locations. The mean lamina temperature is the mean of the 4 depicted lamina temperatures. In panel (b), the calculated lamina saturation ratios with respect to water at the 4 thermocouple locations are shown, as well as their mean. The black solid and dashed vertical lines depict the observed 1 % and 10 % ice activation thresholds, respectively. The maximum modelled S_w range for each ice nucleation onset is the range between the highest and the lowest lamina S_w .

References

Rogers, D. C.: Development of a continuous flow thermal gradient diffusion chamber for ice nucleation studies, *Atmos. Res.*, 22, 149–181, 1988.