

**Electronic Supporting Information**

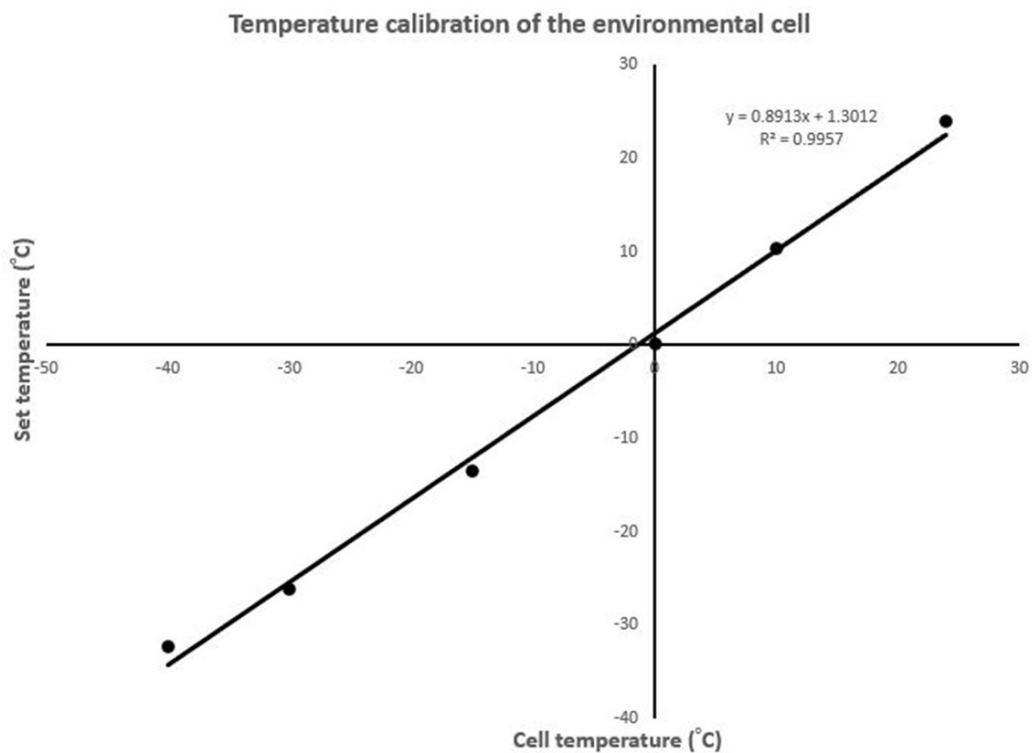
**Immersion Ice Nucleation of Atmospherically Relevant Lipid Particles**

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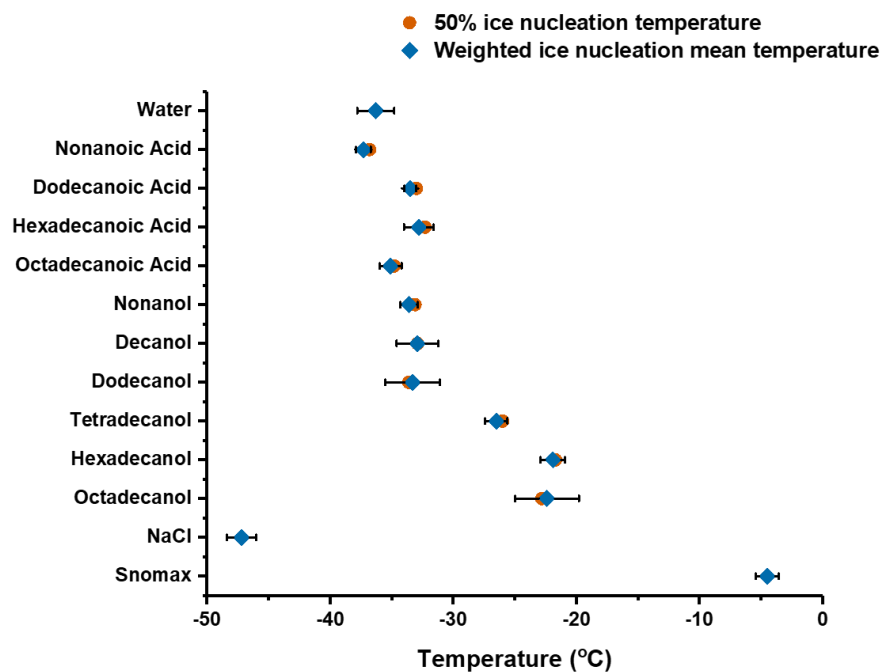
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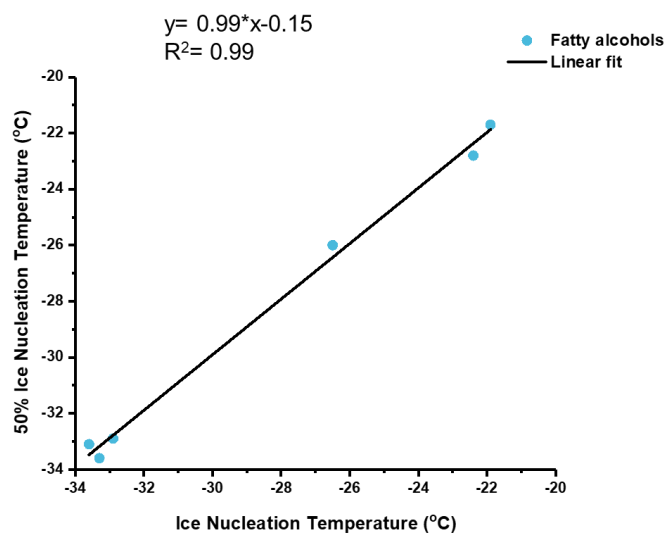
The Electronic Supporting Information (ESI) contains 4 figures and 2 tables.



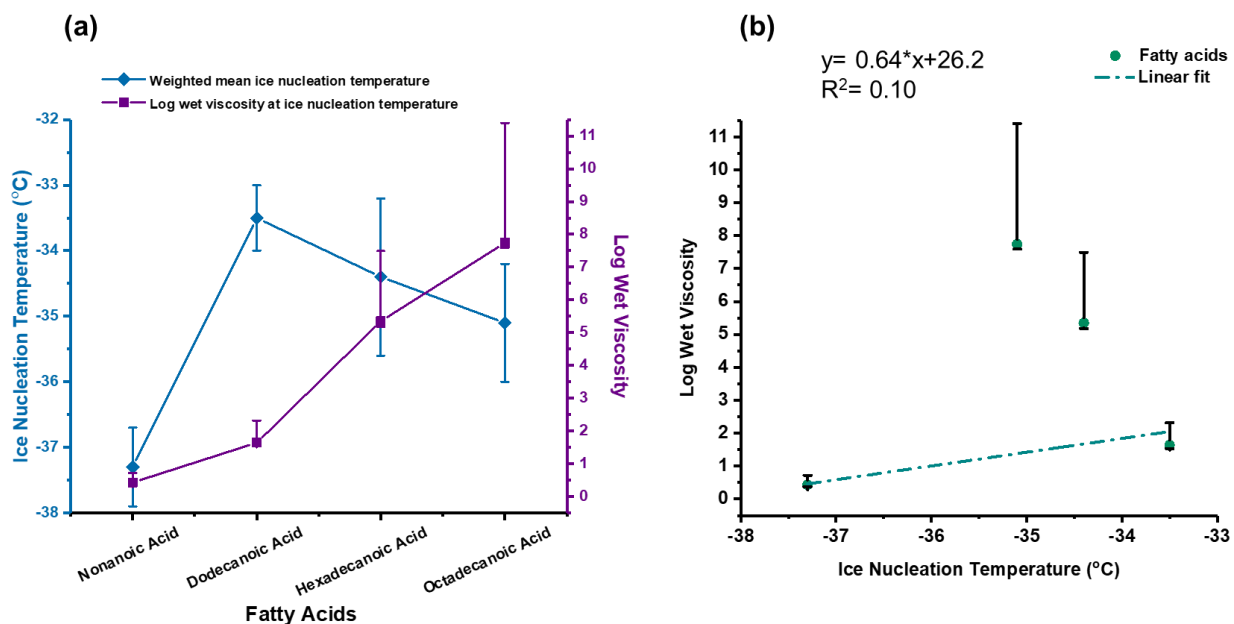
**Figure S1.** Calibration of the environmental cell and the linear relationship between the set temperature and the experimentally determined sample temperature.



**Figure S2.** The weighted ice nucleation mean temperatures for fatty alcohols and fatty acids (blue diamonds) compared to 50% ice nucleation temperatures (orange circles). The error bars represent one standard deviation from the mean.



**Figure S3.** Linear regression of weighted ice nucleation mean temperatures and 50% ice nucleation temperatures for fatty alcohols.



**Figure S4.** (a) illustrates ice nucleation temperatures, depicted by blue diamonds, alongside the estimated logarithm of wet viscosities at corresponding ice nucleation temperatures, represented by purple squares, and (b) a plot of the logarithm of wet viscosity against ice nucleation temperatures is presented for four fatty acids, fitted with a linear regression line. The uncertainties in the estimated log wet viscosities reflect the uncertainty in the fitting parameters in eq 1 to calculate the glass transition temperature.<sup>1</sup>

**Table S1.** Physical properties at 25 °C and melting points of fatty alcohols and fatty acids.

<b>Fatty Species</b>	<b>Physical State at 25 °C</b>	<b>Melting Point (°C)</b>
<b>Nonanol (C9)</b>	Liquid	-5 to -6
<b>Decanol (C10)</b>	Liquid	6
<b>Dodecanol (C12)</b>	Glassy Solid	22 to 27
<b>Tetradecanol (C14)</b>	Solid	37 to 40
<b>Hexadecanol (C16)</b>	Solid	47 to 51
<b>Octadecanol (C18)</b>	Solid	55 to 58
<b>Nonanoic Acid (C9)</b>	Liquid	10 to 12
<b>Dodecanoic Acid (C10)</b>	Solid	43 to 45
<b>Hexadecanoic Acid (C16)</b>	Solid	60 to 65
<b>Octadecanoic Acid (C18)</b>	Solid	69 to 70

**Table S2.** Tabulated values displaying the ice nucleation temperature weighted mean average values and their standard deviation (SD) values for fatty alcohols and fatty acids.

<b>Fatty Species</b>	<b>Ice Nucleation Weighted Mean Average (°C)</b>	<b>Standard Deviation (°C)</b>
<b>Nonanol (C9)</b>	-33.6	0.7
<b>Decanol (C10)</b>	-32.9	1.7
<b>Dodecanol (C12)</b>	-33.3	2.2
<b>Tetradecanol (C14)</b>	-26.5	0.9
<b>Hexadecanol (C16)</b>	-21.9	1.0
<b>Octadecanol (C18)</b>	-22.4	2.6
<b>Nonanoic Acid (C9)</b>	-37.3	0.6
<b>Dodecanoic Acid (C10)</b>	-33.5	0.5
<b>Hexadecanoic Acid (C16)</b>	-32.8	1.2
<b>Octadecanoic Acid (C18)</b>	-35.1	0.9

## REFERENCES

- 1 M. Shiraiwa, Y. Li, A. P. Tsimpidi, V. A. Karydis, T. Berkemeier, S. N. Pandis, J. Lelieveld, T. Koop and U. Po, Global distribution of particle phase state in atmospheric secondary organic aerosols, *Nat. Commun.*, 2017, **8**, 1–7.