

Dear Dr. Armeli, Dr. Peters, and Dr. Koop,

We sincerely appreciate your detailed comments, which helped us identify errors and improve our manuscript. We have carefully gone through your comments and made the corresponding corrections and revisions, which are included in this document along with our explanations and responses. All revisions mentioned in this response will appear in future versions of both the main text and the SI. We hope that our manuscript has now become stronger, and we would greatly appreciate any further suggestions for improvement. Please find our detailed responses and revisions below.

Major Comment:

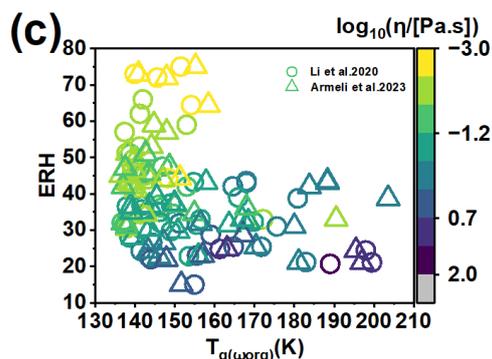
Response: We very much appreciate your comment correcting the T_g values presented in the original Table S4 and thank you for providing detailed explanations, including the correct input parameters, which helped us reexamine our previous calculations. After carefully reviewing our earlier calculations, we found that the T_g values were miscalculated due to the use of T_m in units of degrees Celsius instead of Kelvin, which led to deviations from the reference values.

We have now corrected all T_g values using the correct Functional Group Mode (FGM) and SMILES Mode (SM), both with and without the optional T_m parameter, following your detailed instructions. Our recalculated results agree with the values provided in your comment and with those reported in your previous work. Accordingly, we have updated the manuscript in the following aspects: (1) T_g values were recalculated using the ML method from Armeli et al., 2023, and all parameters and calculated results are included in Figure 1c, S1, S2, and Tables S4 – S7; (2) Discussions about the model in the manuscript were revised to reflect its accuracy; (3) References relevant to your comments are now cited in the manuscript.

With the corrected T_g values, we show that the relationship between T_g and ERH remains weak (Figure 1c), similar to the T_g values interpolated using the parameterization from Li et al. Our main finding therefore remains robust: thermodynamically modeled viscosity continues to show a significantly stronger correlation with ERH than T_g , and the inclusion of T_g provides only negligible statistical improvement to the viscosity-based model.

Revisions:

(1) Figure 1c now includes T_g values achieved from both Li et al. and Armeli et al.



(2) 2.3 Calculation of the fractional glass transition temperature ($T_{g(\omega_{org})}$)

Multiple parameterizations exist for estimating the glass transition temperature (T_g) of organic compounds, utilizing predictors such as chemical structure, volatility, or melting point (T_m) (Armeli et al., 2023; Galeazzo and Shiraiwa, 2022; Koop et al., 2011; Li et al., 2020b).

Recent machine-learning models based on chemical structure do not strictly require T_m information, though including it as an optional parameter can further improve predictive accuracy (Armeli et al., 2023). The framework proposed by Armeli et al. comprises four distinct modes, contingent upon the specific input parameters available for a given compound: the Functional Group Mode (FGM) and the SMILES Mode (SM). Each mode features a variant that includes melting temperature as an additional feature (FGM with T_m ; SM with T_m) and a version that operates without it (FGM no T_m ; SM no T_m). The T_g values and parameters calculated according to the methodology of Armeli et al. are summarized in Tables S4 – S6.

The volatility-based parameterization developed by Li et al. (Eq. 1) predicts T_g from the saturation mass concentration (C^0).

$$T_g = 288.7 - 15.33 \times \log_{10}(C^0) - 0.33 \times [\log_{10}(C^0)]^2 \quad (1)$$

C^0 was estimated as a function of C, O, N, S numbers of the organic compound ($\log_{10}C^0 = f(n_C, n_O, n_N, n_S)$, Eq. 2): (Donahue et al., 2011; Li et al., 2016)

$$\log_{10} C^0 = (n_C^0 - n_C)b_C - n_O b_O - 2 \frac{n_C n_O}{n_C + n_O} b_{CO} - n_N b_N - n_S b_S. \quad (2)$$

Here, n_C^0 is the reference carbon number; n_C , n_O , n_N , and n_S denote the number of

carbon, oxygen, nitrogen, and sulfur atoms, respectively; b coefficients (b_C , b_O , b_N , and b_S) denote atomic contributions fitted via multi-linear least squares analysis from 30,000 compounds across multiple classes (CH, CHO, CHN, CHON, CHOS, and CHONS) (Li et al., 2016). $b_{(CO)}$ represents the carbon-oxygen nonideality.

A comparison between the experimentally measured T_g values of the organic compounds and the predictions derived from the methods of both Li et al. (Li et al., 2020a) and Armeli et al. (Armeli et al., 2023) is presented in Table S6.

The presence of salts inorganic salts (e.g., sodium nitrate) have been demonstrated to modulate the T_g of organic–inorganic mixtures; specifically, depending on the effective T_g of inorganic salt, the T_g of the mixture can be either elevated or depressed (Dette and Koop, 2015b). Typically, the T_g of organic–inorganic mixtures is calculated using the Gordon–Taylor equation (Gordon and Taylor, 1952) :

$$T_g = \frac{\omega_1 T_{g1} + \frac{1}{k} \omega_2 T_{g2}}{\omega_1 + \frac{1}{k} \omega_2} \quad (3)$$

where T_g represents the glass transition temperature of the binary mixture, T_{g1} and T_{g2} are the T_g values of the respective pure compounds, ω_1 and ω_2 denote the mass fractions of the two components, and k is the Gordon–Taylor constant. However, the glass transition temperature of inorganic compounds is limited, we thus employ the glass transition temperature of the organic-water system ($T_{g,org-water}$) as a proxy for the overall mixture T_g when analyzing the correlation between efflorescence relative humidity (ERH) and T_g . In Eq.(3), the parameters ω_2 and T_{g2} are substituted with the mass fraction ω_{org} and the glass transition temperature $T_{g(\omega_{org})}$ of the organic component, respectively, where ω_{org} is the organic mass fraction calculated via the AIOMFAC model at aerosol ERH. $T_{g,w}$ is the glass transition temperature of pure water (136 K) (Kohl et al., 2005), while k_{GT} (the Gordon–Taylor constant) is assumed to be 2.5 for organic–water mixtures (Koop et al., 2011; Zobrist et al., 2008). These two values are substituted for T_{g1} and k in the equation, with ω_1 calculated as $(1-\omega_{org})$. As reported by Koop et al. (Dette and Koop, 2015a), the T_g of NaNO_3 is specified as 290 K. We utilized this value to calculate the T_g for glycerol/ NaNO_3 and sucrose/ NaNO_3 mixtures across a range of

mixing ratios (Figure S1).

(3) Table S4 – S7: Calculation parameters and updated T_g values predicted using the ML-chemical structure method.

Table S4. Input parameters employed for the calculation of glass transition temperatures T_g using the model developed by Armeli et al.

Compound	FG Mode							DBE	Optional* T_m / K	SMILES Mode SMILES String
	-CH ₃	-CH ₂	-CH	-C-	-OH	-O-	=O			
glucose	0	1	4	1	5	0	1	1	420	<chem>C(C1C(C(C(C(O1)O)O)O)O)O</chem>
sucrose	0	3	8	1	8	3	0	2	457	<chem>C(C1C(C(C(C(O1)OC2(C(C(C(O2)CO)O)O)CO)O)O)O)O</chem>
glycerol	0	2	1	0	3	0	0	0	291	<chem>OCC(O)CO</chem>
citric acid	0	2	0	4	4	0	3	3	432	<chem>C(C(=O)O)C(CC(=O)O)(C(=O)O)O</chem>
1,2,6-hexanetriol	0	5	1	0	3	0	0	0	300	<chem>C(CCO)CC(CO)O</chem>
Malonic acid	0	1	0	2	2	0	2	2	408	<chem>C(C(=O)O)C(=O)O</chem>
Oxalic acid	0	0	0	2	2	0	2	0	462.5	<chem>C(=O)(C(=O)O)O</chem>
Glutaric acid	0	3	0	2	2	0	2	2	371	<chem>C(CC(=O)O)CC(=O)O</chem>
Maleic acid	0	0	2	2	2	0	2	3	403.5	<chem>C(=C\C(=O)O)\C(=O)O</chem>
DEMA	2	2	0	3	2	0	2	2	395	<chem>CCC(CC)(C(=O)O)C(=O)O</chem>
DMSA	2	1	0	3	2	0	2	2	413.5	<chem>CC(C)(CC(=O)O)C(=O)O</chem>
DMGA	2	2	0	3	2	0	2	2	376.5	<chem>CC(C)(CC(=O)O)CC(=O)O</chem>
HMMA	1	0	4	4	3	1	1	5	405	<chem>COC1=C(C=CC(=C1)C(C(=O)O)O)O</chem>

* T_m is an optional input parameter for both modes

Table S5. T_g of pure organic compounds calculated using the method of Armeli et al.

Compound	T_g(FGM with T_m)	T_g (FGM no T_m)	T_g (SM with T_m)	T_g (SM no T_m)
Glucose (C ₆ H ₁₂ O ₆)	295.8	300.2	275.3	282.3
Sucrose (C ₁₂ H ₂₂ O ₁₁)	344	342.4	342.5	339.1
Glycerol (C ₃ H ₈ O ₃)	187.4	187.5	187.4	187.7
Malonic acid C ₃ H ₄ O ₄	258.9	231.3	259	234.9
Citric acid C ₆ H ₈ O ₇	284.4	284.4	283.6	283.2
1,2,6-Hexanetriol C ₆ H ₁₄ O ₃	202.3	201.5	203.6	202.7
Oxalic acid C ₂ H ₂ O ₄	276	226.8	271.9	224.9
Glutaric acid C ₅ H ₈ O ₄	261.9	242.4	250.1	252.5
DEMA	274.8	266.2	271.1	270.5
Diethyl malonic acid DMSA	282	262.5	277.9	269.5
2,2-Dimethyl succinic acid DMGA	267.5	266.2	265.6	261.5
3,3-Dimethyl glutaric acid HMMA	276.1	296.2	276.1	284
DL-4-Hydroxy-3- methoxymandelic acid Maleic acid C ₄ H ₄ O ₄	264.1	242.6	261.6	251.8

Table S6. T_g of pure organic compounds calculated using the method of Armeli et al., and the corresponding T_g of the mixed systems derived via the Gordon–Taylor equation.

Compound	ω_{org}	T_g (FGM	T_g (FGM	T_g (SM	T_g (SM
		with T_m)	no T_m)	with T_m)	no T_m)
Glucose (C ₆ H ₁₂ O ₆)/AS	0.19	149.74	150.12	147.98	148.58
	0.24	154.27	154.88	152.04	152.84
	0.33	162.55	163.61	159.48	160.64
Sucrose (C ₁₂ H ₂₂ O ₁₁)/AS	0.32	168.70	168.45	168.47	167.93
	0.50	195.96	195.50	195.53	194.55
	0.33	170.63	170.37	170.38	169.82
	0.41	181.45	181.10	181.12	180.38
Glycerol (C ₃ H ₈ O ₃)/AS	0.51	197.45	196.98	197.01	196.01
	0.10	138.12	138.12	138.12	138.13
	0.18	140.03	140.04	140.03	140.06
	0.30	143.48	143.50	143.48	143.53
	0.50	150.73	150.76	150.73	150.81
	0.61	155.86	155.89	155.86	155.97
	0.09	138.05	138.06	138.05	138.06
	0.19	140.34	140.34	140.34	140.36
Malonic acid C ₃ H ₄ O ₄ /AS	0.13	138.99	138.99	138.99	139.00
	0.10	138.29	138.29	138.29	138.30
	0.18	145.86	143.65	145.87	143.94
	0.25	150.51	147.25	150.52	147.67
	0.41	162.36	156.44	162.38	157.21
	0.55	176.16	167.14	176.20	168.32
	0.23	149.00	146.08	149.01	146.46
	0.09	140.53	139.52	140.54	139.65
	0.05	138.61	138.03	138.62	138.10
	0.17	145.43	143.31	145.43	143.59
Citric acid C ₆ H ₈ O ₇ /AS	0.18	145.84	143.63	145.84	143.91
	0.21	149.89	149.89	149.82	149.78
	0.36	163.11	163.11	162.97	162.89
1,2,6-Hexanetriol C ₆ H ₁₄ O ₃ /AS	0.29	157.00	157.00	156.88	156.83
	0.37	148.78	148.62	149.03	148.86
	0.13	139.91	139.86	139.98	139.93
Oxalic acid C ₂ H ₂ O ₄ /AS	0.56	158.11	157.84	158.54	158.24
	0.34	159.55	151.28	158.86	150.96
	0.45	170.60	158.44	169.59	157.97
Glutaric acid C ₅ H ₈ O ₄ /AS	0.17	146.36	142.72	146.06	142.58
	0.24	150.04	147.86	148.72	148.99
	0.02	137.14	136.96	137.03	137.05
DEMA/AS	0.07	139.41	138.88	139.09	139.16
	0.63	191.78	188.32	190.29	190.05

Diethyl malonic acid					
DMSA/AS		191.16	183.79	189.61	186.44
2,2-Dimethyl succinic acid	0.60				
DMGA/AS		188.84	188.32	188.08	186.43
3,3-Dimethyl glutaric acid	0.63				
HMMA/AS		195.10	203.58	195.10	198.44
DL-4-Hydroxy-3-methoxymandelic acid	0.65				
Oxalic acid/KCl	0.12	143.47	140.85	143.25	140.74
C ₂ H ₂ O ₄	0.27	154.35	147.90	153.81	147.65
	0.40	165.60	155.20	164.73	154.80
Malonic acid/KCl	0.19	146.47	144.12	146.48	144.42
C ₃ H ₄ O ₄	0.03	137.31	137.02	137.31	137.05
Maleic acid/KCl	0.22	149.26	147.04	149.00	147.99
C ₄ H ₄ O ₄	0.51	173.15	166.92	172.43	169.59
	0.72	201.50	190.51	200.22	195.21
Glutaric acid/NaCl	0.18	146.34	144.74	145.37	145.57
C ₅ H ₈ O ₄	0.01	136.44	136.37	136.40	136.41
	0.20	147.14	145.42	146.10	146.31
	0.64	188.06	180.00	183.18	184.18
	0.75	204.92	194.24	198.46	199.77
Malonic acid /NaCl	0.56	177.21	167.95	177.24	169.16
C ₃ H ₄ O ₄	0.63	186.36	175.05	186.40	176.52
Glycerol /NaNO ₃	0.43	147.91	147.93	147.91	147.98
(C ₃ H ₈ O ₃)	0.27	142.62	142.63	142.62	142.65
	0.07	137.55	137.55	137.55	137.56
	0.14	139.11	139.12	139.11	139.13
	0.52	151.57	151.60	151.57	151.66
	0.42	147.54	147.56	147.54	147.60
	0.64	157.50	157.54	157.50	157.63
Sucrose/NaNO ₃	0.45	187.29	314.83	183.84	186.08
(C ₁₂ H ₂₂ O ₁₁)	0.28	163.85	307.44	161.98	163.20

Table S7. Comparison of the experimentally measured T_g of organic compounds with values predicted using the method of Li et al. and the method of Armeli et al.

Compound	T_g literature(Armeli Iapichino et al., 2023)	T_{gLi} (Li et al., 2020)	T_g / K			
			$T_{gArmeli}$ (Armeli et al., 2023)		FGM with T_m	FGM no T_m
Glucose	303	253.32	295.8	300.2	275.3	282.3
Sucrose	334	350.97	344.0	342.4	342.5	339.1
Glycerol	186	181.38	187.4	187.5	187.4	187.7
Citric acid	284.35	274.53	284.4	284.4	283.6	283.2
1,2,6-Hexanetriol	204.15	192.25	202.3	201.5	203.6	202.7
Mean Absolute Error / K		18.6	4.0	3.1	7.8	6.0

(4) Figure S1 & S2: T_g of organic- $NaNO_3$ mixture and the comparison between the use of different T_g predictions.

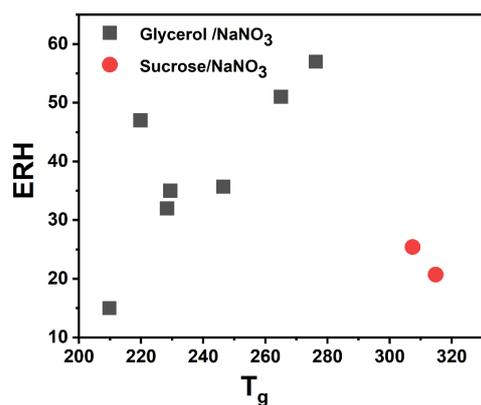


Figure S1. Calculated T_g of glycerol/ $NaNO_3$ and sucrose/ $NaNO_3$ systems at various mixing ratios, plotted against their respective efflorescence points. The calculations are based on the reported T_g of 290 K for $NaNO_3$.

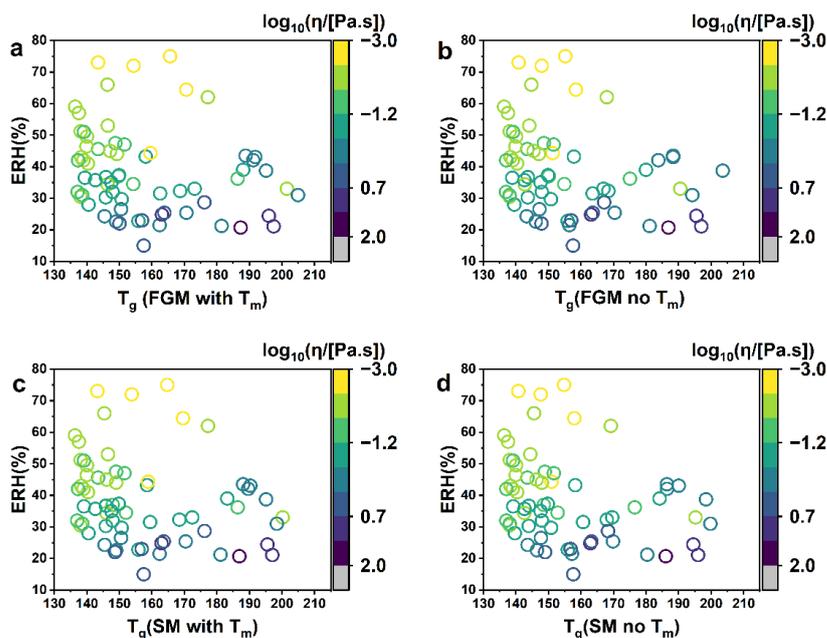


Figure S2. Relationships between the ERH of organic-inorganic mixed aerosols. (a) T_g (FGM with T_m), (b) T_g (FGM no T_m), (c) T_g (SM with T_m), and (d) T_g (SM no T_m), T_g of organic compounds calculated using the methodology and online predictor of Armeli et al. (Armeli et al., 2023), and the resulting T_g of organic–inorganic mixtures derived via the Gordon–Taylor equation.

Additional comments

(1) On page 6 of the main text the authors state “Since inorganic salts involved in this study do not exhibit T_g due to crystallization [...]”. However, even if T_g of pure inorganic salts such as sodium nitrate cannot be measured directly due to crystallization, such salts have been shown to influence the T_g of organic/inorganic mixtures. For example, depending upon the T_g of the pure organic, inorganic salts have shown to increase or decrease the T_g of the mixture (cf. Figure 2 and 4 in Dette and Koop, 2015). Therefore, it appears to us that ignoring the effect of the inorganic salt on T_g by representing it only by the fractional T_g of the organic phase may lead to a misrepresentation. In some cases, for example the binary mixture of sodium nitrate and sucrose, the T_g of the mixture over nearly the entire composition range is known and could be used instead, or at least used as a test case for comparison.

Response: We sincerely thank the reviewer for this insightful comment and for directing our attention to the important work of Dette and Koop (Dette and Koop, 2015a). We entirely agree with your point: inorganic salts can indeed significantly

influence the glass transition temperature T_g of organic/inorganic mixtures. Our initial decision to simplify the calculation by representing the mixture's T_g primarily through the organic phase was fundamentally constrained by the limited availability of reliable, experimentally derived T_g data for pure inorganic salts and their specific multi-component mixtures across our broader dataset. We therefore decided to use the fractional T_g values for the organic/water mixtures which are also derived from the Gordon–Taylor equation, which ensures that the underlying mathematical basis remains the same. To address your concern and test whether this proxy method leads to a misrepresentation of our findings, we followed your suggestion and conducted a supplementary correlation analysis. We calculated the T_g of the mixtures by incorporating the T_g of pure NaNO_3 . The results of this re-evaluation demonstrate that, regardless of whether the pure inorganic salt T_g or water T_g is used in the Gordon-Taylor framework, the newly calculated T_g of the organic/inorganic mixtures still exhibits no apparent correlation with the ERH. Therefore, while the inclusion of the inorganic component's T_g should be more accurate and shifts the T_g values, it does not alter the fundamental relationships observed, nor does it affect the major findings of this study. We have revised the main text to acknowledge the influence of inorganic salts on mixture T_g ((Dette and Koop, 2015b)), explained why our core conclusion remains robust despite the data constraints. We deeply appreciate this crucial discussion, and look forward to further investigating the complex role of inorganic salt T_g in mixed systems. We believe that more experimental T_g data of pure inorganic salts are important in understanding aerosol physiochemical behaviors.

Revisions:

(1) Typically, the T_g of organic–inorganic mixtures is calculated using the Gordon–Taylor equation (Gordon and Taylor, 1952) :

$$T_g = \frac{\omega_1 T_{g1} + \frac{1}{k} \omega_2 T_{g2}}{\omega_1 + \frac{1}{k} \omega_2} \quad (3)$$

where T_g represents the glass transition temperature of the binary mixture, T_{g1} and T_{g2} are the T_g values of the respective pure compounds, ω_1 and ω_2 denote the mass fractions

of the two components, and k is the Gordon–Taylor constant. However, the glass transition temperature of inorganic compounds is limited, we thus employ the glass transition temperature of the organic-water system ($T_{g,org-water}$) as a proxy for the overall mixture T_g when analyzing the correlation between efflorescence relative humidity (ERH) and T_g . In Eq.(3), the parameters ω_2 and T_{g2} are substituted with the mass fraction ω_{org} and the glass transition temperature $T_{g(\omega_{org})}$ of the organic component, respectively, where ω_{org} is the organic mass fraction calculated via the AIOMFAC model at aerosol ERH. $T_{g,w}$ is the glass transition temperature of pure water (136 K) (Kohl et al., 2005), while k_{GT} (the Gordon–Taylor constant) is assumed to be 2.5 for organic–water mixtures (Koop et al., 2011; Zobrist et al., 2008). These two values are substituted for T_{g1} and k in the equation, with ω_1 calculated as $(1-\omega_{org})$. As reported by Koop et al. (Dette and Koop, 2015a), the T_g of NaNO_3 is specified as 290 K. We utilized this value to calculate the T_g for glycerol/ NaNO_3 and sucrose/ NaNO_3 mixtures across a range of mixing ratios (Figure S1).

(2) As indicated in Table S6, the Functional Group Mode without T_m (FGM without T_m) exhibits the minimum Mean Absolute Error. Consequently, this specific mode was selected to calculate the T_g of the mixtures for a comparative analysis with the parameterization developed by Li et al. (Li et al., 2020a). The results, presented in Figure 1c, demonstrate that neither methodology yields a statistically significant correlation. Furthermore, analyses employing alternative FGM and SMILES models for T_g estimation (Figure.S2), and the T_g for organic-inorganic were also investigated (Figure S1). Similarly, no discernible correlation with ERH was observed.

(2) It is unclear to us why the authors used a training set and a test set because, as far as we understand, they perform a least-squares regression. This splitting procedure is followed in ML algorithms to avoid overfitting. However, in our opinion, overfitting in least-squares regression can be avoided by using a simple regression formula with not too many parameters, as it is done in the current procedure of Chen et al. 2026^[1]. If the authors prefer to use a training set and a test set, would a cross-validation procedure be advantageous when splitting up the dataset, as it would allow for a more

robust assessment of the model's generalizability than a single training-test split?

Response: We sincerely thank the reviewer for raising this point. We completely agree that for a simple least-squares regression with few parameters, overfitting is generally not a primary concern. Here, we would like to clarify the rationale behind our dataset division. Our splitting procedure was a separation based on the source of the data to test the external generalizability of our model. Specifically, the datasets were divided as follows:

Training Set: This set consists of the experimental ERH data from our research group, and all corresponding viscosity data were derived using the AIOMFAC model. This dataset was utilized to establish relationship between ERH and other parameters.

Validation Set: This set comprises independent experimental results that either reported both aerosol ERH and viscosity reported or observed no efflorescence.

By evaluating the regression model, developed from our own experimental setup, against this entirely independent external dataset, our objective was to demonstrate that the observed relationship is robust and applicable across different laboratory conditions, measurement techniques, and groups. We borrowed the term of training set and validation set from machine learning methods which likely causes the confusion.

Revision:

2.1 The dataset for the parameterization

...A total of 102 ERH data points for organic-inorganic mixture aerosols were collected: 66 ERH points for the training set (Table S1) and the remaining 36 points for the validation set (Table S2). The training set includes aerosol compositions containing 14 organic compounds (composed of C, H, and O) and 4 inorganic salts (ammonium sulfate, ammonium nitrate, sodium chloride, and potassium chloride) mixed in varying ratios. All ERH data in the training were from our previous studies, and all corresponding viscosity data were derived using the AIOMFAC model. The validation set contains 36 ERH data from systems involving 12 organic compounds and 4 inorganic salts (Table S2), selected from studies that either reported both aerosol ERH and viscosity reported or observed no efflorescence...

(3) A comparison of Figures 2 and S1 reveals that the Glucose/AS mixture is listed twice in the legend of Figure 2, and the Sucrose/ NaNO_3 mixture is missing.

Response: We thank the reviewers for their careful inspection of the figures. In the revised manuscript, we have corrected the legend to ensure it is fully consistent with the training dataset listed in Table S1.

Revision:

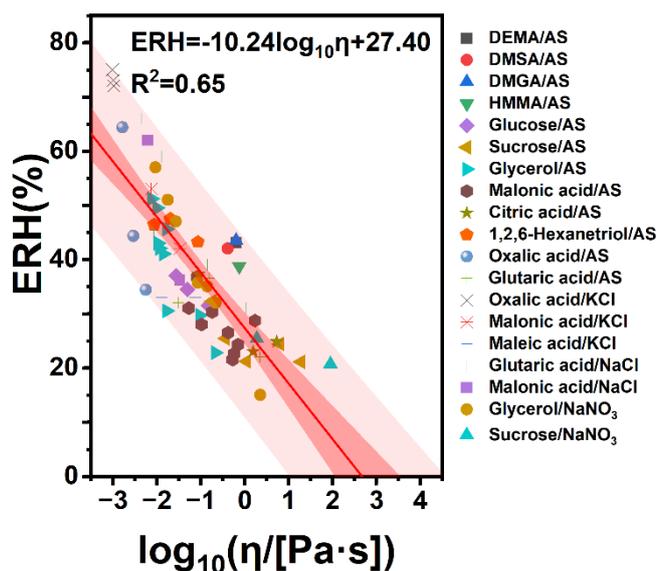


Figure 2. Linear fitting of aerosol ERH for different organic-inorganic aerosols by using viscosity ($\log_{10} \eta$) as the predictor. Data points are color- and shape-coded to distinguish between different organic and inorganic aerosol species. The red solid line represents the linear regression fit between viscosity and ERH. The dark pink band indicates the 95% confidence interval, while the light pink band shows the prediction interval. AS refers to ammonium sulfate, DEMA represents Diethyl malonic acid, DMSA represents 2,2-Dimethyl succinic acid, DMGA represents 3,3-Dimethyl glutaric acid, HMMA represents DL-4-Hydroxy-3-methoxymandelic acid and DHBA represents 2,5-Dihydroxybenzoic acid.

(4) In equation (5) and Figure 2, the authors report a threshold viscosity of $4.76 \times 10^2 \text{ Pa}\cdot\text{s}$. Could they also provide the 95% confidence intervals and the prediction intervals for this value?

Response: We have provided the 95% prediction interval for the threshold viscosity. Based on the regression analysis, the threshold viscosity is determined to be $4.76 \times 10^2 \text{ Pa}\cdot\text{s}$, and the corresponding 95% confidence interval is $[1.05 \times 10^2, 3.24 \times 10^3] \text{ Pa}\cdot\text{s}$. We

have updated the discussion about Eq. (5) to include these values.

(5) In lines 139–140, the authors state that our T_g model is a T_m -based method. This statement is incorrect because our ML model is a chemical structure-based model and does not require information of T_m . However, it allows T_m to be included as an additional input parameter, which slightly improves its predictions (see Table A for comparison).

Response: We sincerely appreciate your kind reminder for the mischaracterization of your model in our manuscript. We have corrected the text in the revised manuscript to accurately describe your machine-learning model as a chemical structure-based method rather than a T_m -based one. We have also explicitly clarified that while T_m is not a mandatory input, including it as an optional parameter can further enhance the model's predictive accuracy. The revised paragraph now properly distinguishes between volatility-based, T_m -based, and chemical structure-based parameterizations.

Revision: Have been included in “2.3 Calculation of the fractional glass transition temperature ($T_{g(\text{org})}$)” above.

The references below are now cited in the revised manuscript.

Armeli, G., Peters, J.-H., and Koop, T.: Machine-Learning-Based Prediction of the Glass Transition Temperature of Organic Compounds Using Experimental Data, ACS Omega, 8, 12298–12309, <https://doi.org/10.1021/acsomega.2c08146>, 2023.

Detle, H. P. and Koop, T.: Glass Formation Processes in Mixed Inorganic/Organic Aerosol Particles, J. Phys. Chem. A, 119, 4552–4561, <https://doi.org/10.1021/jp5106967>, 2015a.

Detle, H. P. and Koop, T.: Glass Formation Processes in Mixed Inorganic/Organic Aerosol Particles, J. Phys. Chem. A, 119, 4552–4561, <https://doi.org/10.1021/jp5106967>, 2015b.