Supplement information for
Ylisirniö et. al. AMT-2020-254

S1. Different P_{sat} values used in FIGAERO-ToF-CIMS calibrations in different studies

Table S1. Collection of literature-based P_{sat} (Pa) values used in various published FIGAERO calibrations.

Saturation pressure (Pa)	**Lopez-Hilfiker et al., (2014)**	**Stark et al., (2017)**	**Nah et al., (2019)**	**Bannan et al., (2019)**	**Ye et al., (2019)**
Glutaric acid		6.7×10^{-4}	1×10^{-3}	1×10^{-3}	4×10^{-4}
Cis-Pinonic acid	6×10^{-5}	0.03	7.8×10^{-4}	7.79×10^{-4}	
Pimelic acid	1×10^{-4}		2.6×10^{-4}		
Erythritol			6.3×10^{-5}		
Palmitic acid	1×10^{-4}		2.0×10^{-5}		5×10^{-5}
Azelaic acid	6×10^{-6}	6×10^{-6}	7.4×10^{-6}		
Oleic acid	1×10^{-6}				
Stearic acid	1×10^{-5}		2.5×10^{-6}		
Sebacic acid	1.5×10^{-6}		1.5×10^{-6}		
Behenic acid	7×10^{-4}		4.9×10^{-8}		
Oleic acid	$(0.066 – 2.66) \times 10^{-5}$				
Tricarballylic acid		3×10^{-7}			3.1×10^{-7}
Pinic acid	6×10^{-5}	4.3×10^{-5}		3.2×10^{-5}	9.3×10^{-5}
Citric acid					2.7×10^{-10}
Camphoric acid					2×10^{-4}
Dodecanoic/lauric acid					0.01
Succinic acid				1.3×10^{-3}	
Malonic acid				6.2×10^{-4}	
Adipic acid				1.8×10^{-4}	
Suberic acid				2.23×10^{-5}	

S2. Measurement schematics

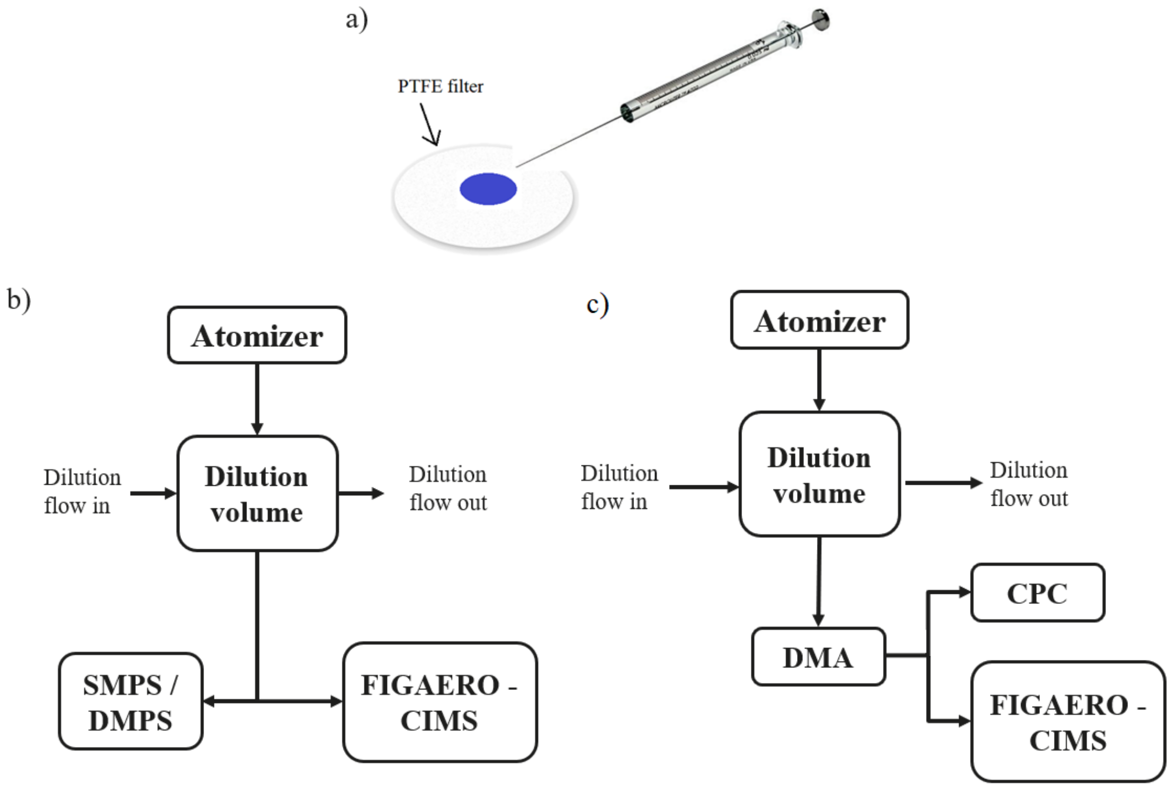

Figure S1. Panel a) illustration of the syringe deposition method. Measurement setup schematics for the atomizer method either with b) polydisperse particles or c) monodisperse particles. The dilution volume is used in the atomizer method to ensure complete evaporation of the solvent before particle characterization.

S3. Measured T_{max} values

Table S2. Average T_{max} values (˚C) and standard deviations based on three repetitions, as shown in Figure 3 panel a). Used P_{sat} (Pa), based on Krieger et al., (2018), *are shown in the bottom row.*

Experiment	**PEG-4**	**PEG-5**	**PEG-6**	**PEG-7**	**PEG-8**
Conc. 0.1 g L^{-1}	49.9±4.4	74.6 ± 3.1	94.6 ± 2.8	110.9 ± 2.4	123 ± 2
Conc. 0.01 g L^{-1}		38.5 ± 1.2	58.5 ± 1.5	76.8 ± 1.2	90.9 ± 0.9
Conc. 0.003 g L^{-1}		36.7 ± 1.9	57 ± 2.5	73.1 ± 2.9	88.7 ± 2.8
Atomizer		23.3 ± 0.5	39.9 ± 0.4	54.7 ± 0.4	65.5 ± 0.2
Saturation pressure (Pa)	0.0169	5.29 x 10^{-4}	3.05 x 10^{-5}	1.29 x 10^{-6}	9.2 x 10^{-8}

Table S3. Average T_{max} values (˚C) and standard deviations based on three repetitions, as shown in Figure 3 panel b). Used saturation pressure (Pa) values are shown in the bottom row.

Experiment	**Palmitic acid**	**Pimelic acid**	**Oleic acid**	**Azelaic acid**	**Stearic acid**	**Sebacic acid**
Conc. 0.5 g L^{-1}	55.8 ± 0.3	54 ± 0.1	61.8 ± 2.8	63.3 ± 0.3	64.7 ± 0.5	73.1 ± 0.1
Conc. 0.1 g L^{-1}	48.9 ± 1	46.1 ± 1.1	51.2 ± 1.8	54.8 ± 1.2	55.8 ± 1	62.6 ± 1.2
Conc. 0.01 g L^{-1}	40.6 ± 1.2	39.5 ± 2	43.9 ± 2.8	41.5 ± 1.5	44.8 ± 2.5	46.1 ± 0.4
Atomizer	36.6 ± 0.6	34 ± 0.4	34.7 ± 0.8	40.2 ± 0.7	43.5 ± 0.6	49.4 ± 1
Saturation pressure (Pa)	1.4 x 10^{-4}	1.3 x 10^{-4}	1 x 10^{-5}	6 x 10^{-6}	1 x 10^{-6}	1.47 x 10^{-6}

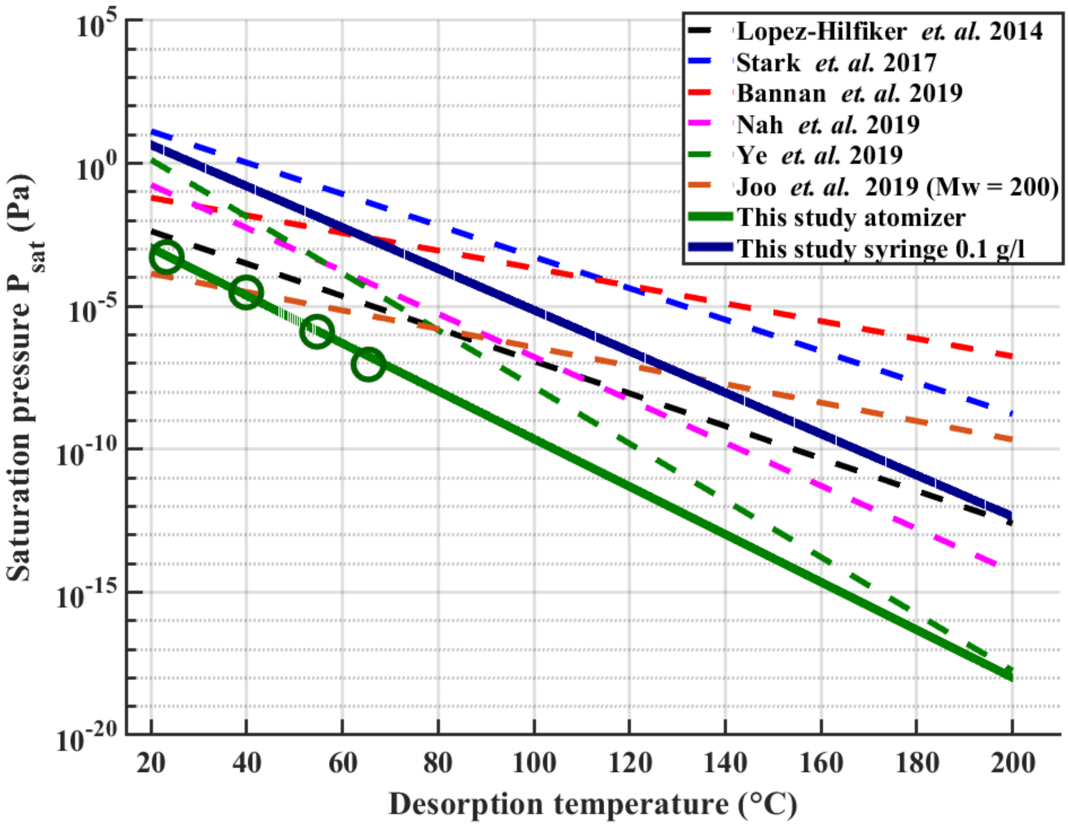

Figure S2. Repeated Fig. 1 (dashed lines) with calibration lines from this study added for the atomizer method (green solid line) and the syringe method (for a solution concentration of 0.1 g L^{-1}, solid blue line). Both lines are for 30 min ramping times and the atomizer measurements used polydisperse aerosol with a median particle size of 60 nm. Green circles show the measured data where the line have been fitted.

S4. P_{sat} of higher order PEGs

We performed additional T_{max} measurements of an atomized PEG-400 solution (Sigma Aldrich), which contains different PEGs so that the average molecular mass of the solution is about 400 g/mol. Detected PEGs ranged from PEG-6 to PEG-16. Fig. S3 a) shows measured T_{max} values of different PEGs versus the molecular mass of the compounds. The measured points follow well a second order polynomial fitted to the points. It should be noted that T_{max} values of PEG-400 are about 5-7 ˚C higher than values measured for individual PEGs, possibly due to additional stabilization compounds in the product. Figure S3 b) shows a somewhat bold log-linear extrapolation of saturation pressures from measured PEGs (4-8) up to PEG-16.

In Fig S3 c) we show two extrapolations for P_{sat} vs. measured T_{max}. Extrapolation a) was done by substituting T_{max} values in eq. (2) with the polynomial fit to molecular mass ($T_{max} = d\,Mw^2 + e\,Mw + f$, where Mw is molecular weight and d, e and d are fitted constants), shown in Fig. S3a, while using fit coefficients a and b from eq. (2). I.e., extrapolation a) estimates P_{sat} values based on molecular mass. Extrapolation b) was done by directly fitting the normal logarithm of P_{sat} vs molecular mass (Fig. S3 b).

As can be seen, the two extrapolation methods for P_{sat} lead to substantially different extended calibration curves in the higher desorption temperatures. Our results anyhow strongly suggest that higher order PEGs could be used for extending the volatility calibration range, if their saturation vapor pressures were established by accurate independent measurements or estimated with high enough certainty.

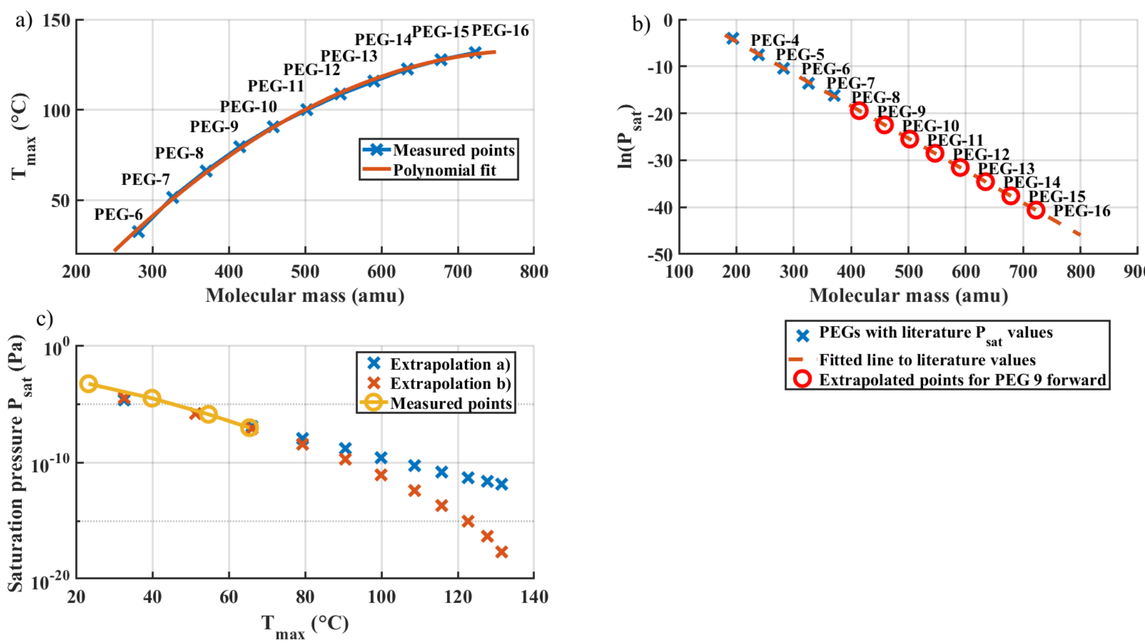

Figure S3. Panel a) measured T_{max} values (crosses) vs. molecular mass of the PEGs contained in the PEG-400 mixture, and a polynomial fit applied to the data. Panel b) natural logarithm of saturation pressure vs. PEG molecular mass, and a linear fit to the literature-supported data sub-set (crosses), extrapolated to extend to all other PEGs (circles). Panel c) saturation pressure P_{sat} vs T_{max} extrapolated to cover all PEG, using extrapolations based on the fitted functions in panels a) and b).

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