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Supplement of

Model studies of volatile diesel exhaust particle formation: are organic vapours involved in nucleation and growth?

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a) b)

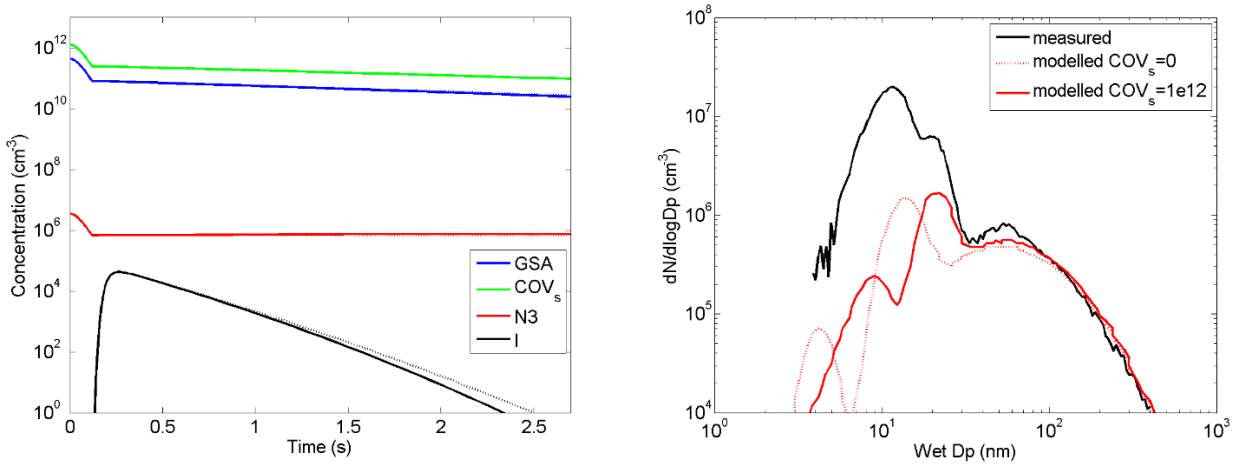


Figure S1. a) Time evolution of particle number concentration (N_3), gaseous sulphuric acid (GSA), condensable organic vapour (COV_s) in cm^{-3}, and nucleation rate (I) in cm^{-3} s^{-1}. b) Measured (black) and modelled (red) particle number size distribution at the end of the ageing chamber. Raw exhaust GSA = $4e10^{11}$ cm^{-3}. NUP formation occurred via HBN mechanism.

a) b) c)

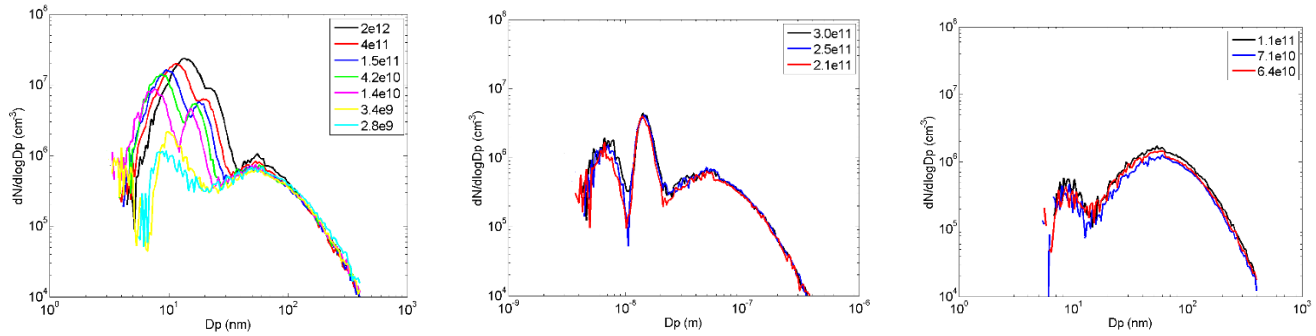


Figure S2. Measured particle number size distributions at the end of the ageing chamber with 100% (a), 75% (b) and 50% (c) engine loads. The raw exhaust GSA concentrations (cm^{-3}) are mentioned in the legends.

a) b)

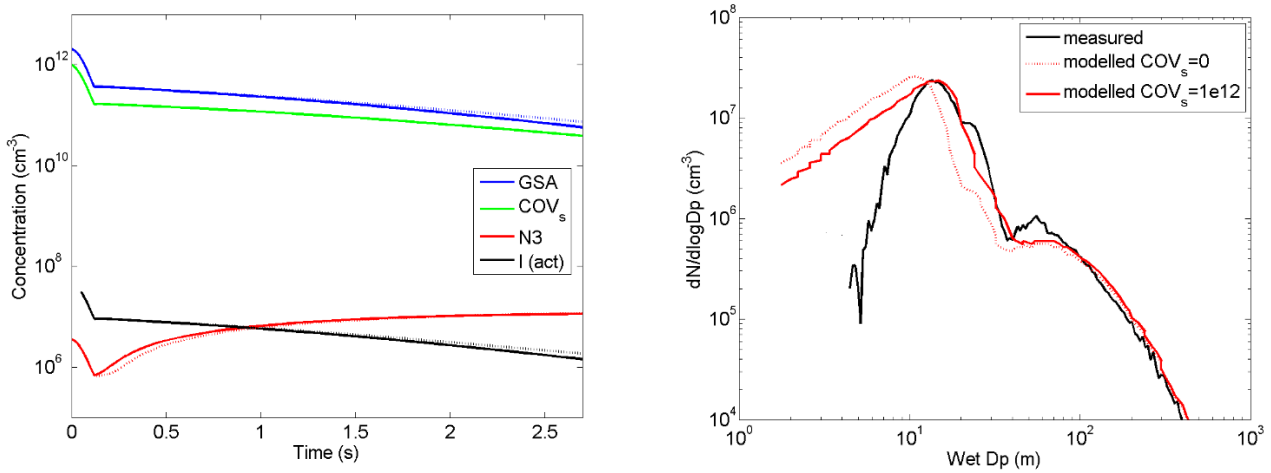


Figure S3. Time evolution of particle number concentration (N_3), gaseous sulphuric acid (GSA) and condensable organic vapour (COV_s) in cm^{-3}, as well as nucleation rate (I) in cm^{-3} s^{-1} (a), and measured (black) and modelled (red) particle number size distribution at the end of the ageing chamber (b). Raw exhaust GSA = $2e10^{12}$ cm^{-3} and COV_s = $1e10^{12}$ cm^{-3}. Dashed lines refer to COV_s = 0 cm^{-3}. NUP formation occurred via the ACT mechanism.

a) b)

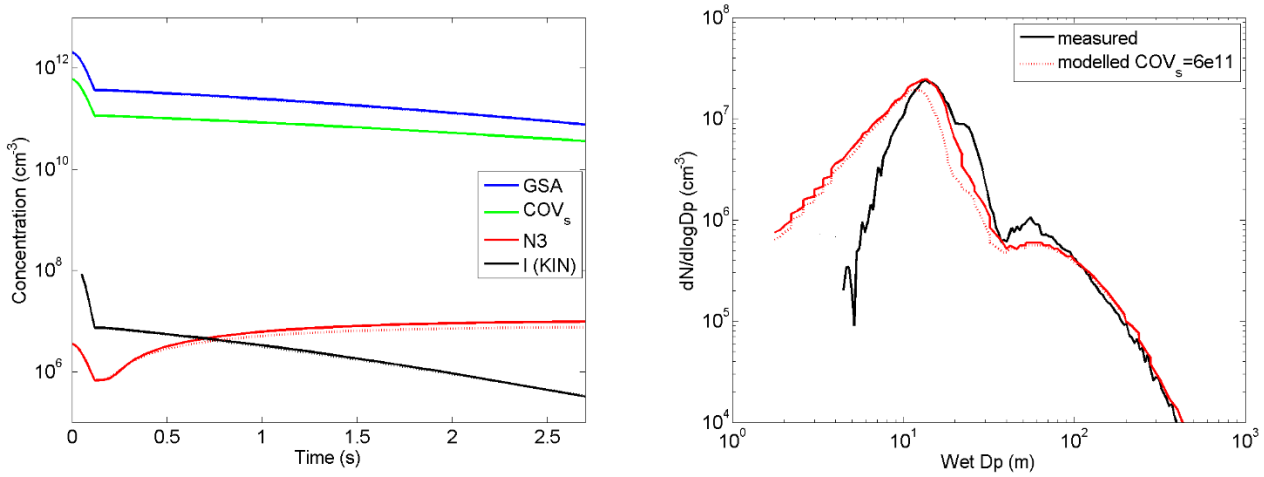
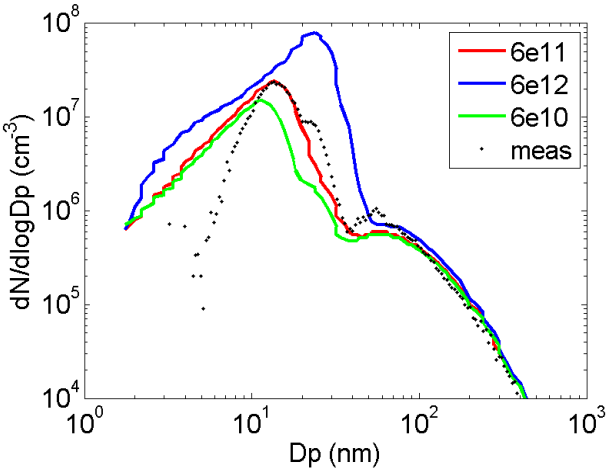
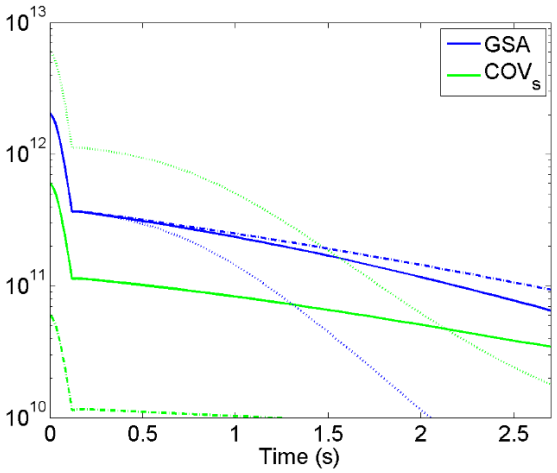


Figure S4. Time evolution of particle number concentration (N_3), gaseous sulphuric acid (GSA) and condensable organic vapour (COV_s) in cm^{-3}, as well as nucleation rate (I) in cm^{-3} s^{-1} (a), and measured (black) and modelled (red) particle number size distribution at the end of the ageing chamber (b). Raw exhaust GSA = $2e10^{12}$ cm^{-3} and COV_s = $6e10^{11}$ cm^{-3}. Dashed lines refer to COV_s = 0 cm^{-3}. NUP formation occurred via the KIN mechanism.

a)



b)



c)

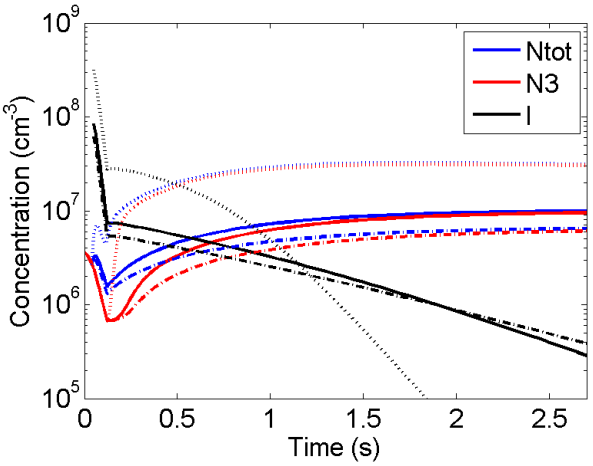


Figure S5. Number size distribution at the end of the simulation (a), time evolution of gas concentrations (b), time evolution of particle number concentration and nucleation rate (c) with the COV_s concentrations of $6x10^{10}$ (dashdot curves), $6x10^{11}$ (base case, solid curves), and $6x10^{12}$ (dotted curves) cm^{-3}. Raw exhaust GSA = $2e10^{12}$ cm^{-3}. The nucleation mechanism for these simulations was HET.

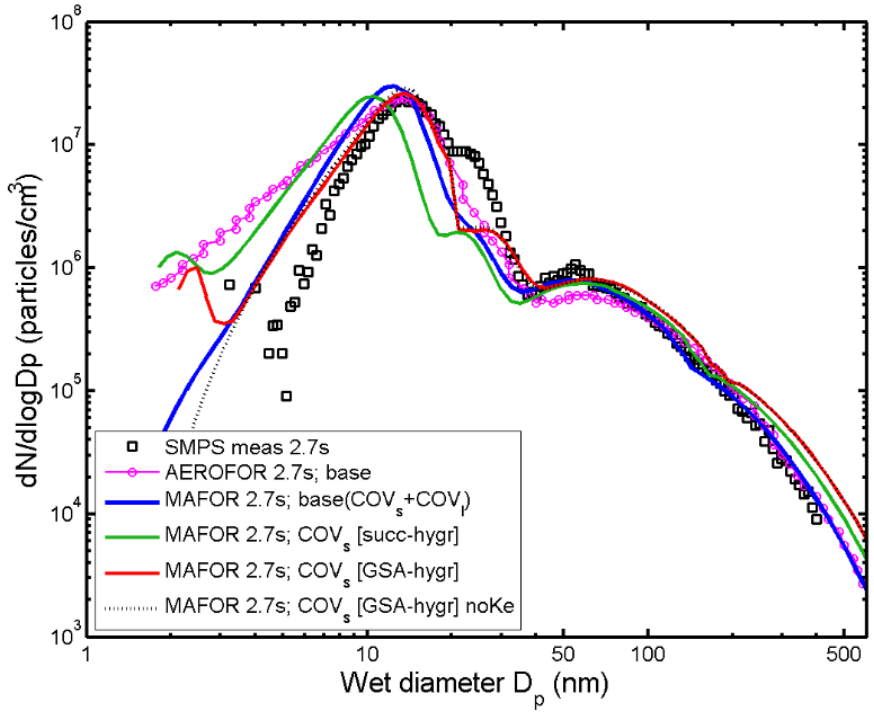


Figure S6. Number size distribution at the end of the simulation for the base case (HET nucleation) when the properties of the condensable organic vapours were changed as given in legend. COV_s and COV_l refer to semi-volatile and low-volatile vapours. Also shown is the measured size distribution as well as the predicted result from AEROFOR. See details in the text.