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Formation of secondary organic aerosol coating on black carbon particles near vehicular emissions

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PMF analysis

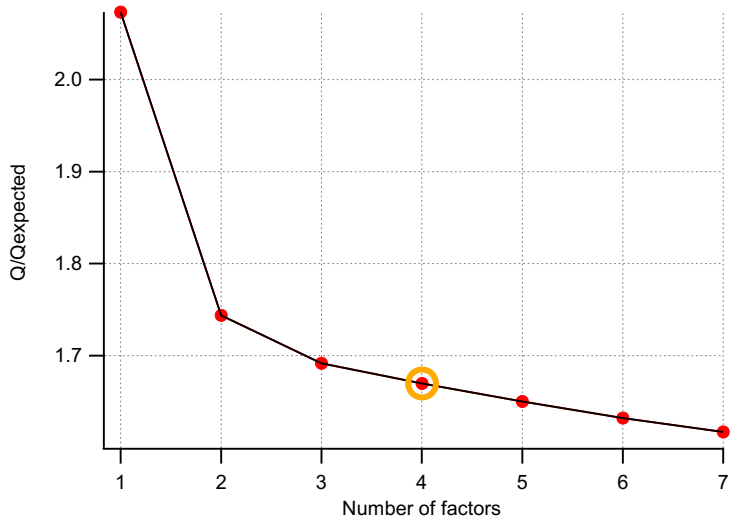

Figure S1: $Q/Q_{expected}$ values as a function of number of PMF factors. A 4-factor solution, including two POA factors from traffic emissions and two SOA factors due to local photochemistry, was determined as a final solution.

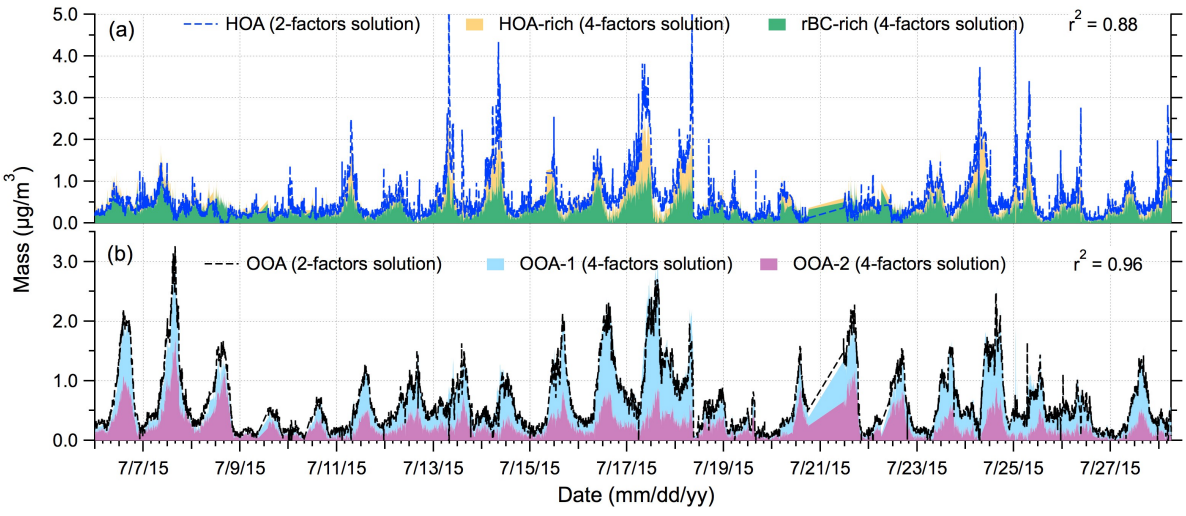

Figure S2: Time series of 2-factor solution: (a) HOA and (b) OOA. Increasing the number of PMF factors to four splits HOA into HOA-rich and rBC-rich factors and OOA into OOA-1 and OOA-2 factors. The physical meanings of individual factors are described in the main text (RIE of 0.26 and 1.4 were applied for rBC and organic fragments, respectively).

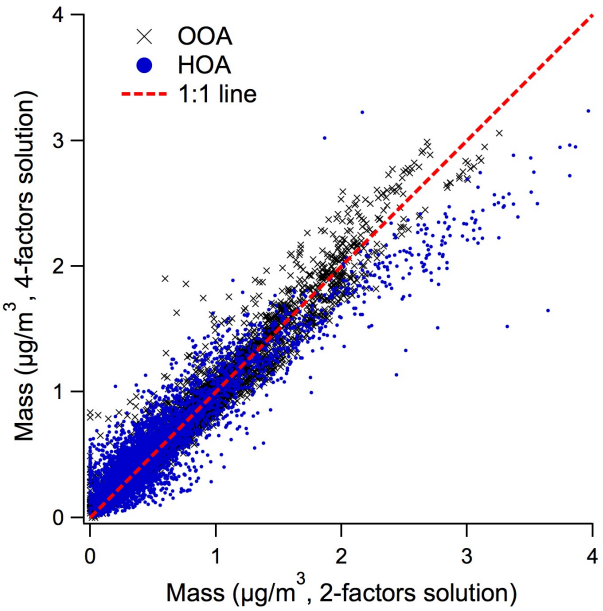

Figure S3: Correlations between 4-factor and 2-factor solutions: (HOA-rich + rBC-rich) vs. HOA and (OOA-1 + OOA-2) vs. OOA. (RIE of 0.26 and 1.4 were applied for rBC and organic fragments, respectively)

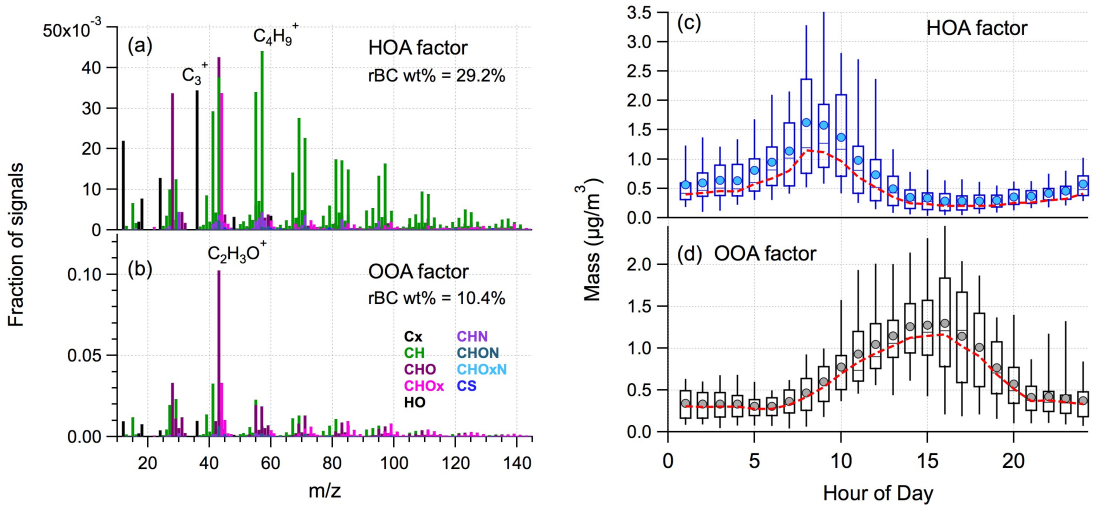

Figure S4: Mass spectra (a-b) and diurnal cycles (c-d) of 2-factor solution from SP-AMS data within the hot period. (Box plots: 5th, 25th, 50th, 75th and 95th percentile, Filled circles: mean values for organic + C_x^+ fragments, Red dashed lines: mean values for organic alone.

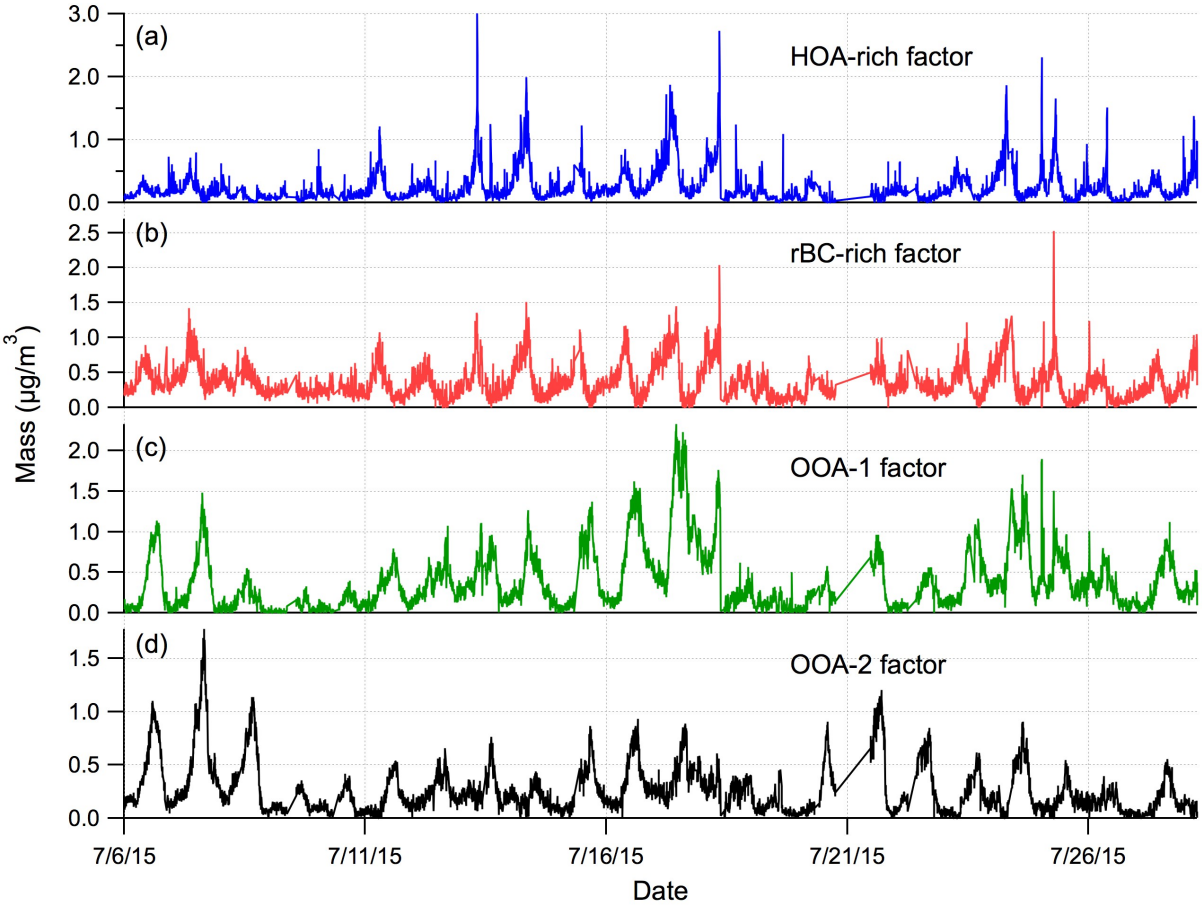

Figure S5: Time series of the 4-factor solution: (a) HOA-rich, (b) rBC-rich, (C) OOA-1, and (d) OOA-2 (RIE of 0.26 and 1.4 were applied for rBC and organic fragments, respectively).

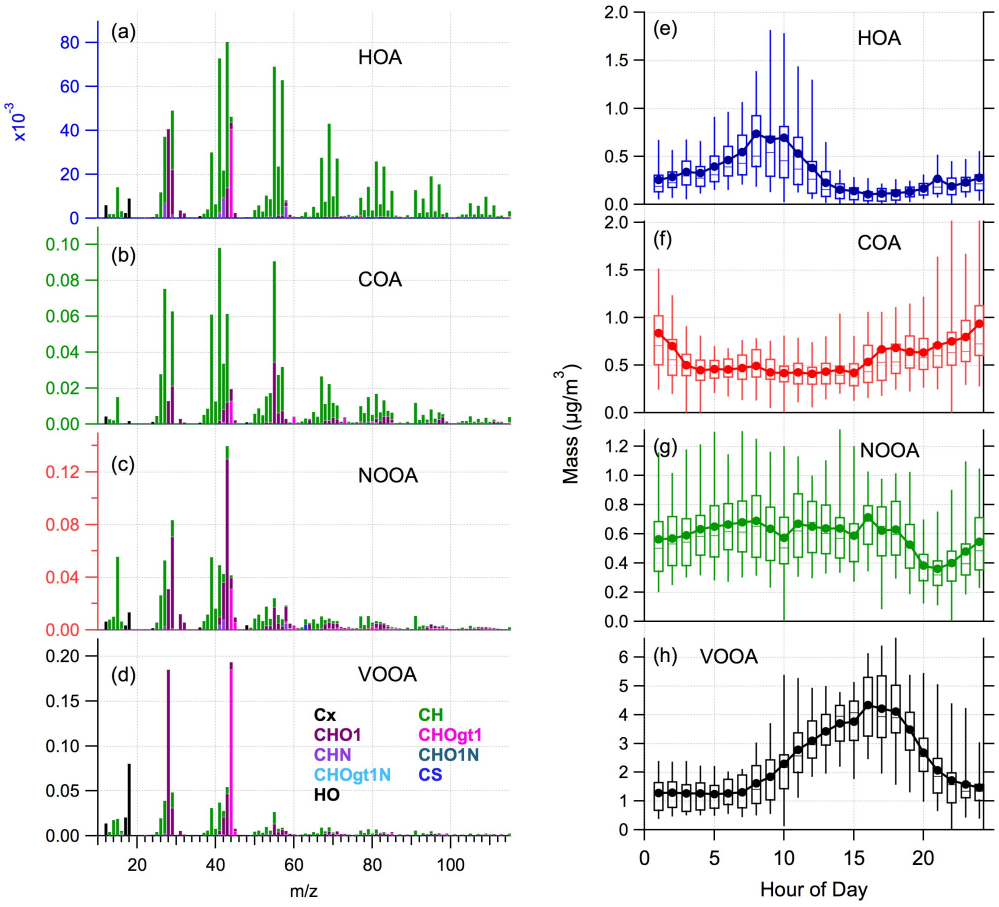

Figure S6: Mass spectra (a-d) and diurnal cycles (e-h) of 4-factor solution from HR-ToF-AMS data within the hot period. (Box plots: 5th, 25th, 50th, 75th and 95th percentile, Filled circles: mean values) (Chen et al., submitted)

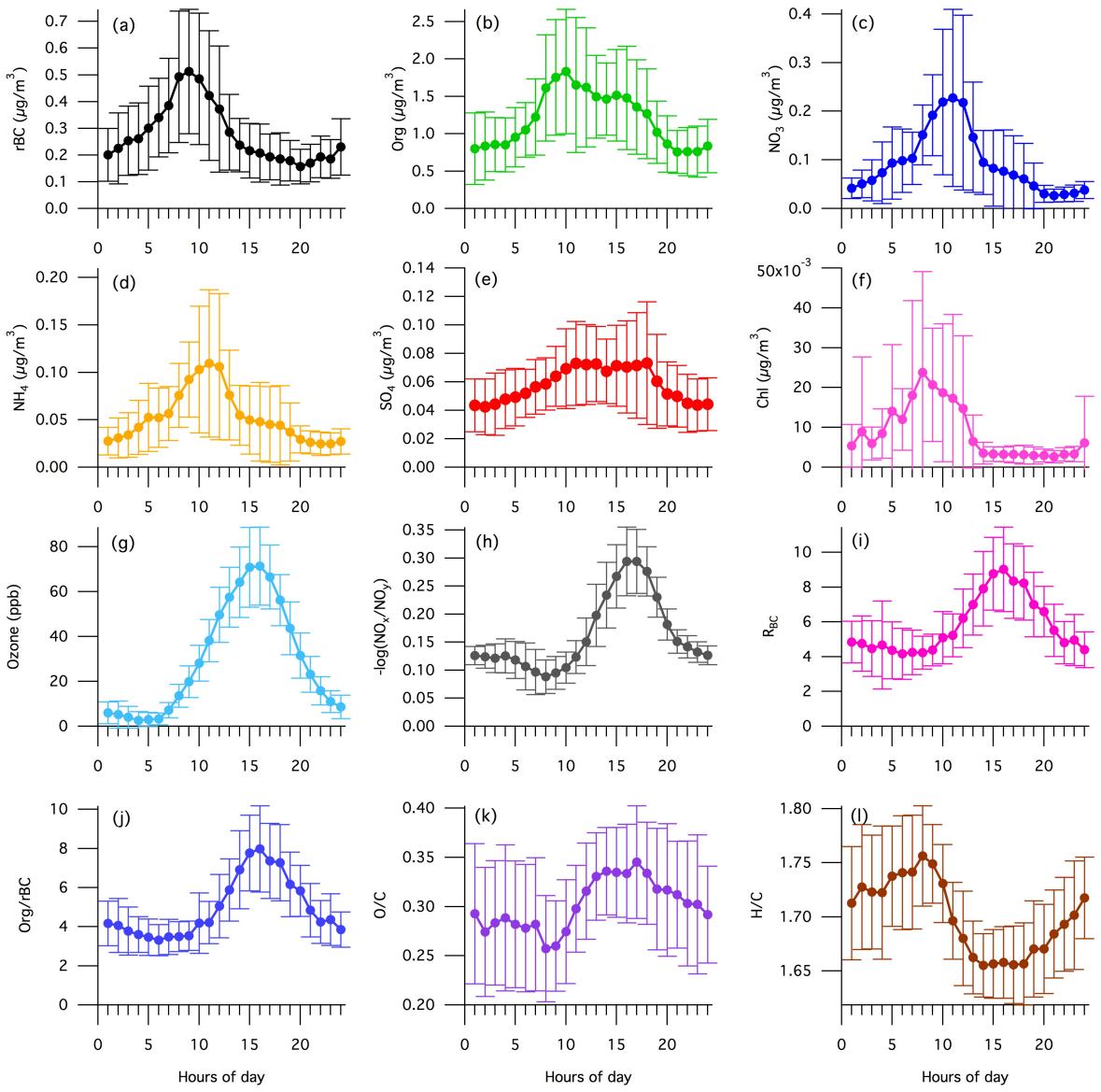

Figure S7: Diurnal cycles of (a) rBC, NR-PM_{rBC} components, including (b) Organics, (c) nitrate, (d) ammonium, (e) sulfate and (f) chloride, (g) ozone, (h) -log(NO_x/NO_y), (i) R_{BC}, (j) Org/rBC ratio, (k) O/C and (l) H/C of organic coating. The data points represent average values and the error bars represent one standard deviation.

References:

Chen, C.-L., Chen, S., Russell, L. M., Liu, J., Price, D. J., Betha, R., Sanchez, K. J., Lee A. K. Y., Collier, S. C., Zhang, Q., Kumar, A., Kleeman, M., Zhang, X., and Cappa, C. D.: Organic aerosol particle chemical properties associated with residential burning and fog in wintertime San Joaquin Valley (Fresno) and with vehicle and firework emissions in summertime South Coast Air Basin (Fontana), submitted.