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The impact of traffic on air quality in Ireland: insights from the simultaneous kerbside and suburban monitoring of submicron aerosols

Chunshui Lin et al.

Correspondence to: Ru-Jin Huang (rujin.huang@ieecas.cn) and Colin O'Dowd (colin.odowd@nuigalway.ie)

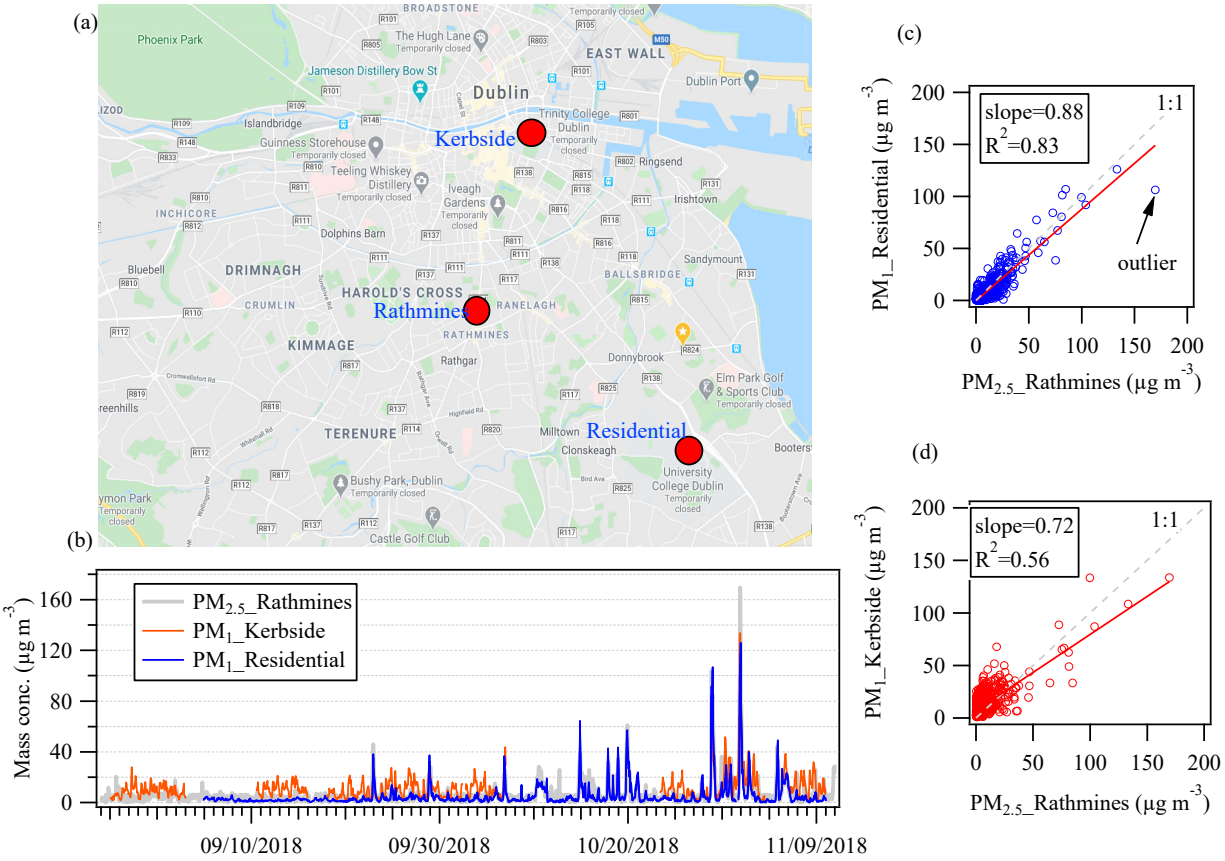


Figure S1. (a) Sampling sites for PM_1 measurements in Dublin marked by the red cycles at the kerbside (i.e., Trinity College Dublin) and residential site (i.e., University College Dublin), as well as for $PM_{2.5}$ measurement at Rathmines; (b) time series of PM_1 and $PM_{2.5}$; (c) scatter plot between residential PM_1 and Rathmines $PM_{2.5}$; and (d) scatter plot between Kerbside PM_1 and Rathmines $PM_{2.5}$. Also shown in (c) and (d) are the slopes and correlation coefficients (R^2) from the linear relationship. Note that removing the outlier in (c) resulted in a slope of 0.93 instead of 0.88. The map was adapted from Google Maps.

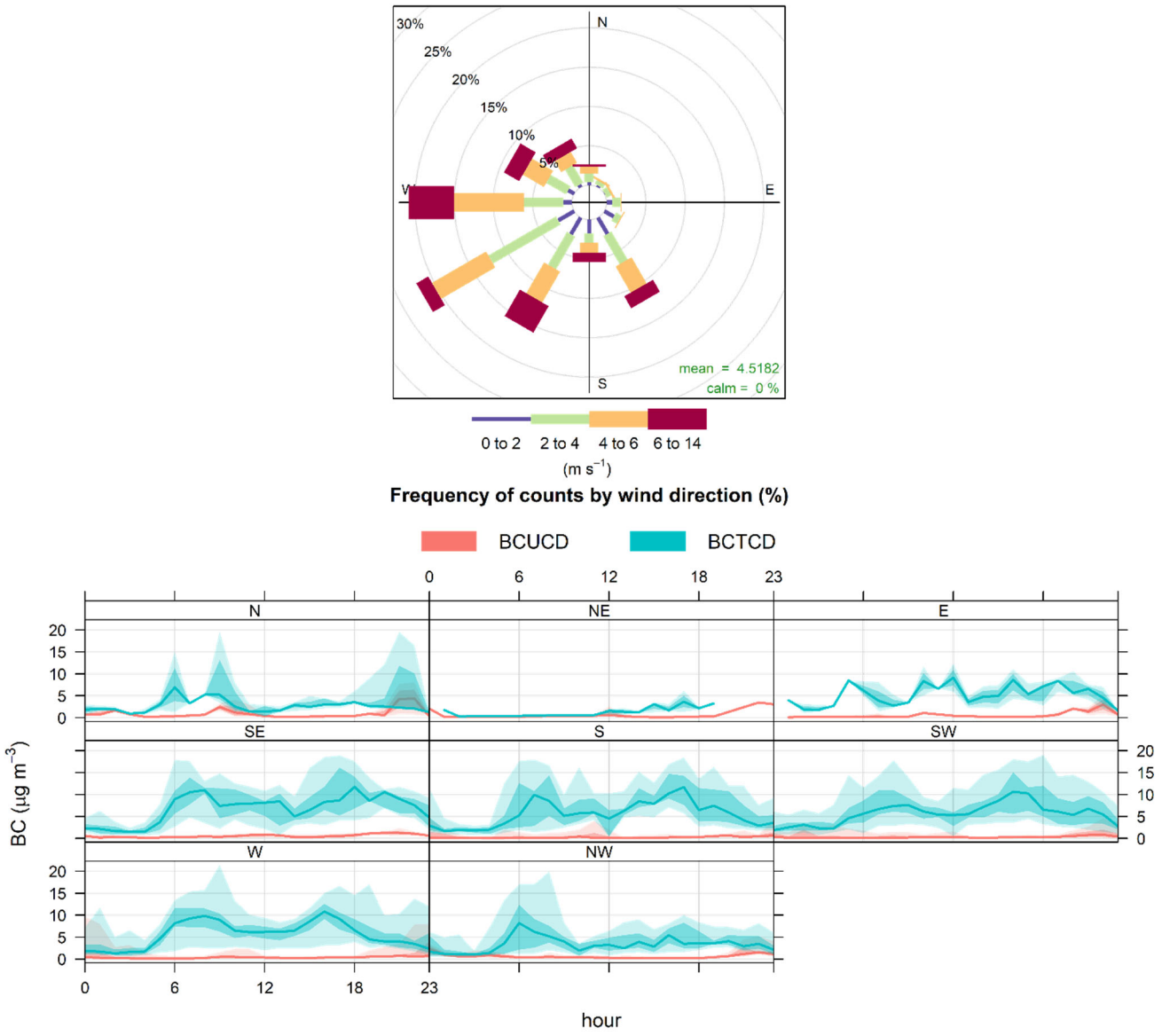
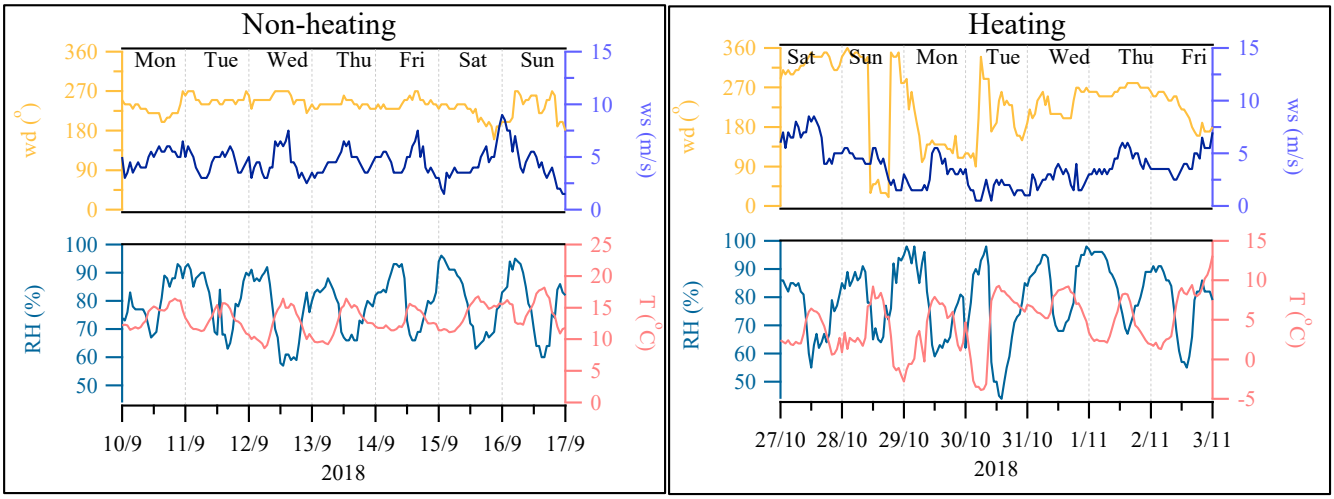
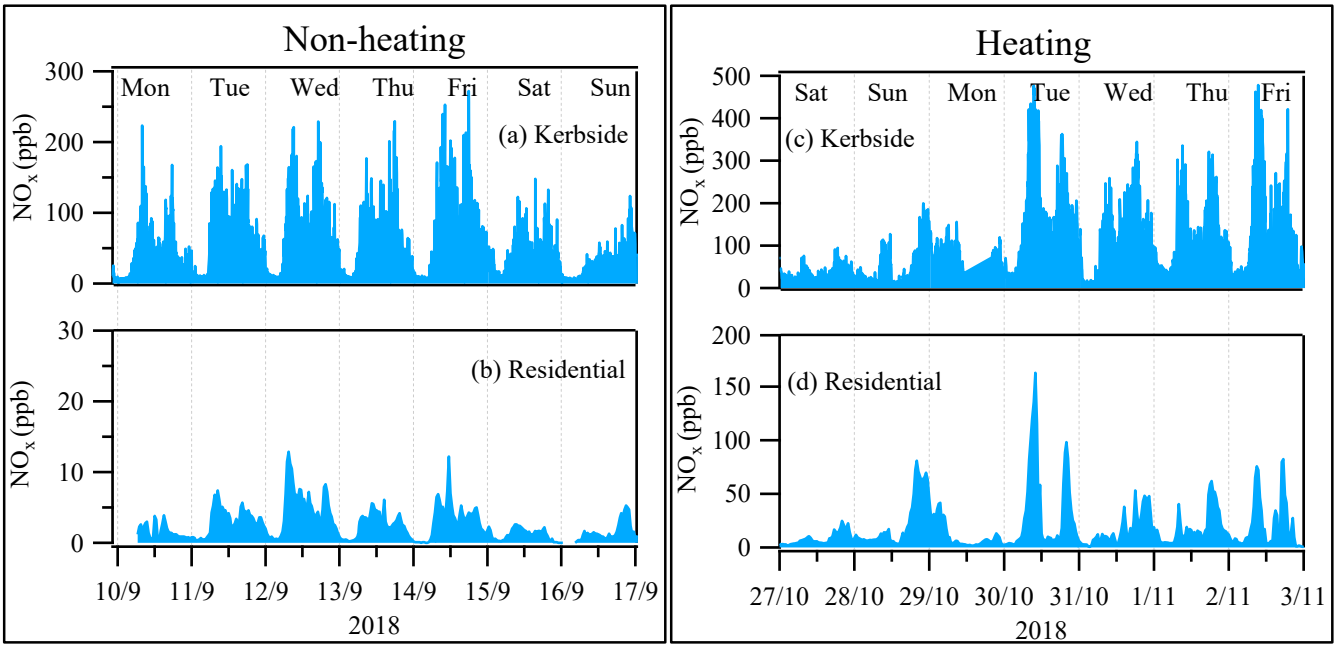


Figure S2. Windrose plot over the entire sampling period (top panel); and the diurnal pattern of BC at the Kerbside (BC_Kerb) and BC at the residential site (BC_Res) under the same wind directions (bottom panel). The solid lines are the median values and the shades are 5th, 25th, 75th, and 95th percentiles. Gaps are due to insufficient data.



35 **Figure S3. Time series of wind direction (wd), wind speed (ws), relative humidity (RH), and temperature (T) during non-heating (left panel) and heating (right panel).**



40 **Figure S4. Time series of the mixing ratio of NO_x (ppbv) during non-heating and heating at the kerbside (a, c) and residential site (b, d). Also shown is the day of the week, including Monday (Mon), Tuesday (Tue), Wednesday (Wed), Thursday (Thu), Friday (Fri), Saturday (Sat), and Sunday (Sun).**

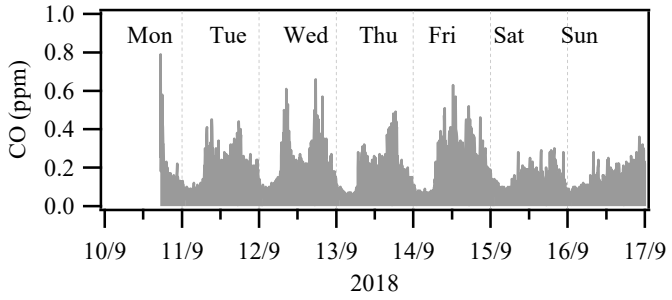


Figure S5. Time series of the mixing ratio of CO (ppmv) at the kerbside during non-heating. Note that the CO measurement was not available at the residential site. Also shown is the day of the week, including Monday (Mon), Tuesday (Tue), Wednesday (Wed), Thursday (Thu), Friday (Fri), Saturday (Sat), and Sunday (Sun).

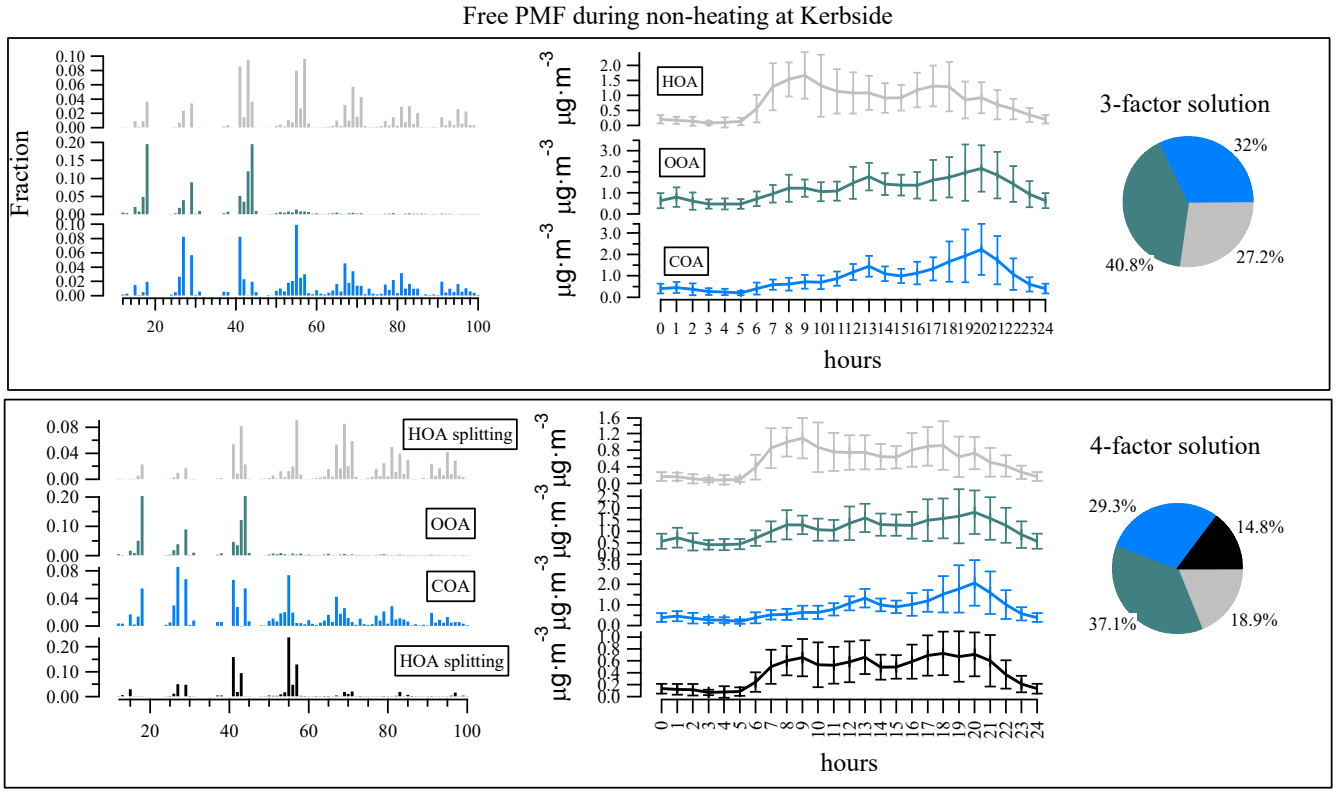


Figure S6. Mass spectral profiles and diurnal, as well as the relative contribution of the free PMF three- (top) and four- (bottom) factor solutions at the kerbside during non-heating. The four-factor solution shows an HOA splitting factor because its diurnal pattern was similar to HOA. For the diurnal cycles, the colored line represents the mean per hour of the day, and the error bar is one standard deviation.

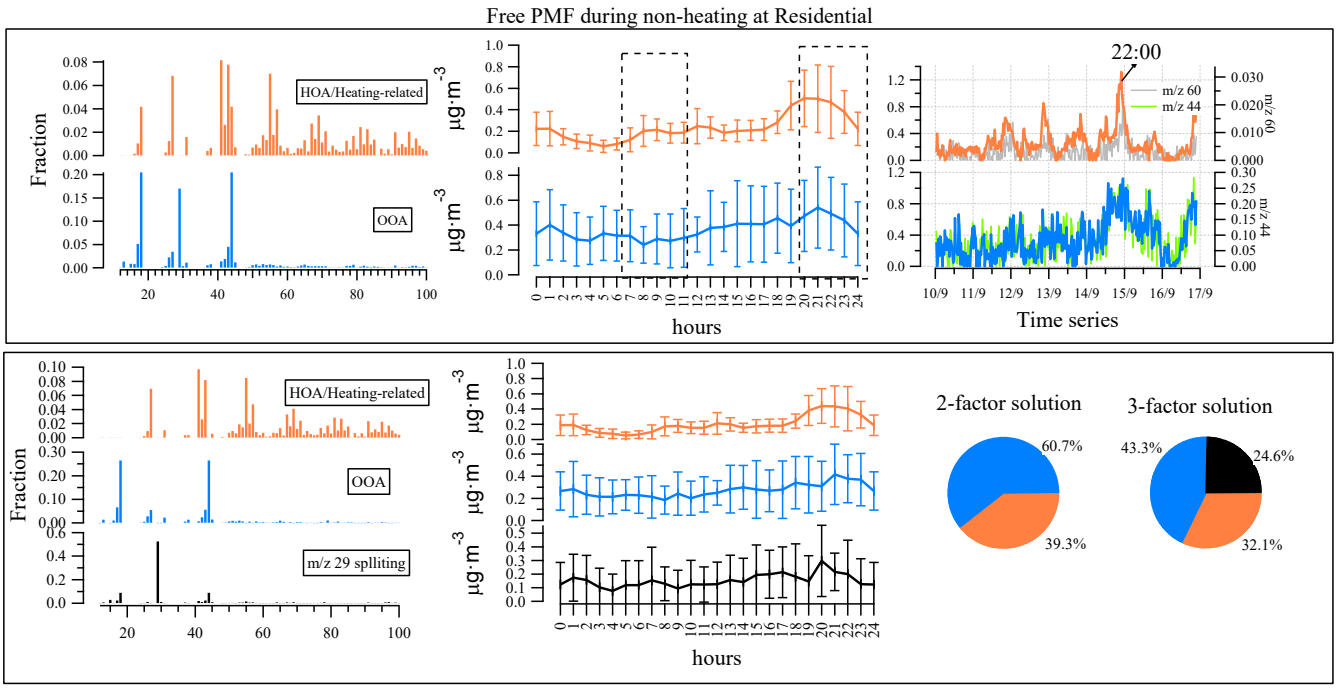


Figure S7. Mass spectral profiles and diurnal, as well as the relative contribution of the free PMF two- (top) and three- (bottom) factor solutions at the residential site during non-heating. The three-factor solution shows an m/z 29 splitting factor. For the diurnal cycles, the colored line represents the mean per hour of the day, and the error bar is one standard deviation.

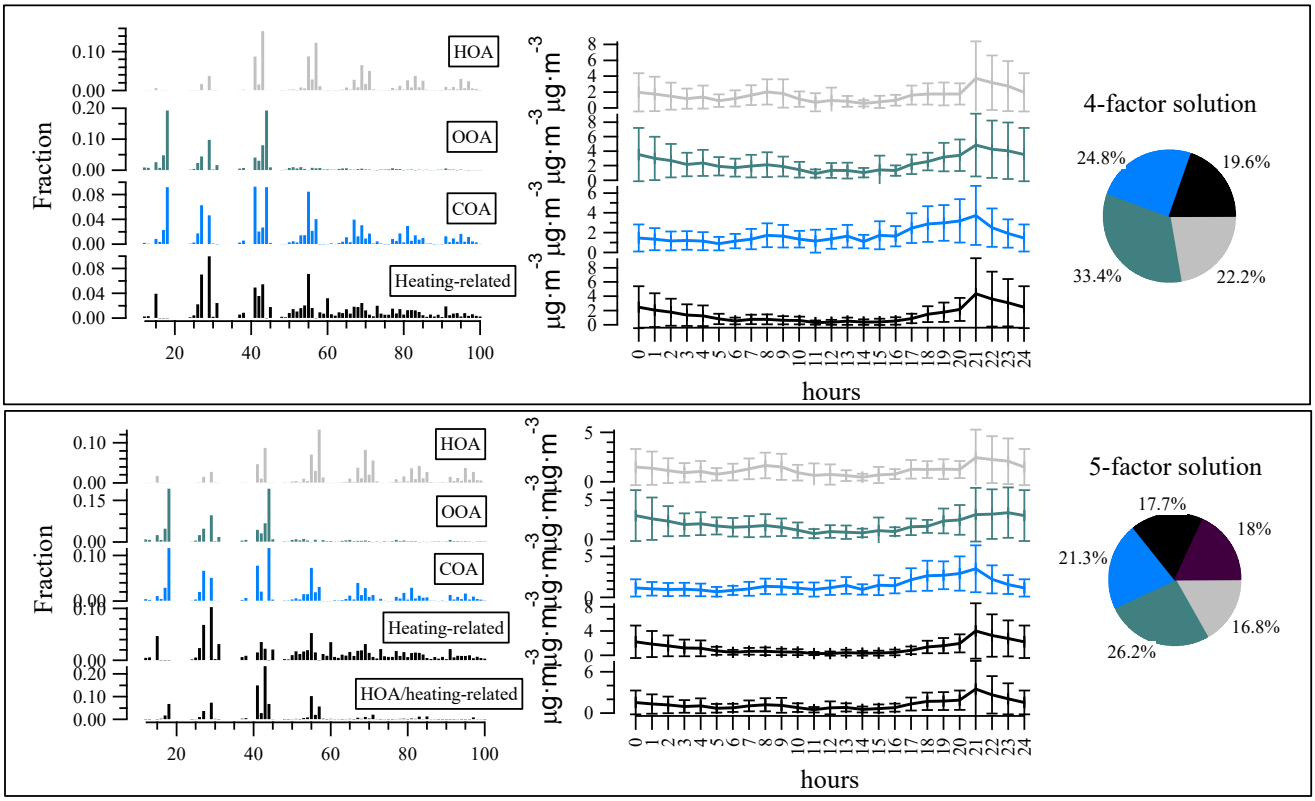


Figure S8. Mass spectral profiles (left panels) and diurnal (mid panels), as well as the relative contribution of the free PMF four- (top) and five- (bottom) factor solutions at the kerbside during heating. For the diurnal cycles, the colored line represents the mean per hour of the day, and the error bar is one standard deviation.

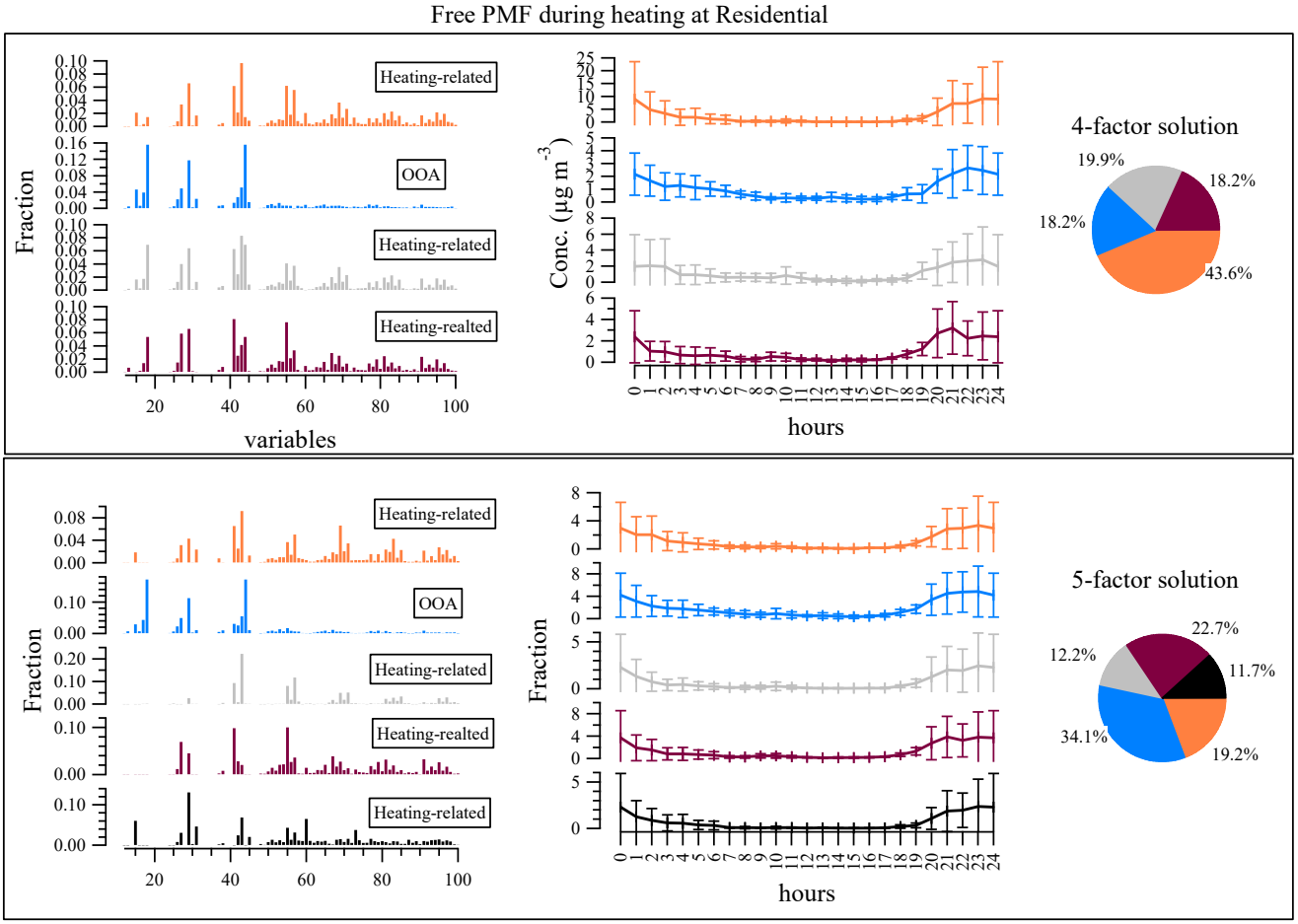


Figure S9. Mass spectral profiles (left panels) and diurnal (mid panels), as well as the relative contribution of the free PMF four- (top) and five- (bottom) factor solutions at the residential site during heating. For the diurnal cycles, the colored line represents the mean per hour of the day, and the error bar is one standard deviation.

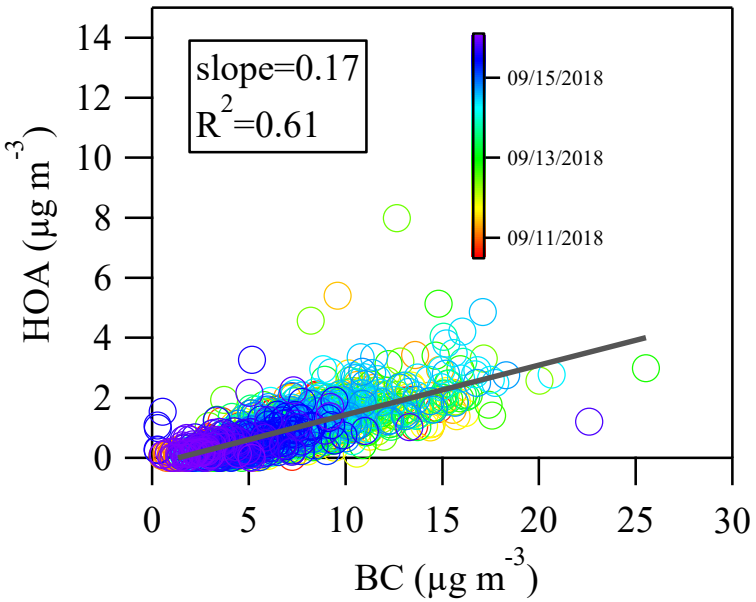


Figure S10. Linear regression between HOA and BC with a slope of 0.17 and R^2 of 0.61 during the non-heating period at the kerbside.

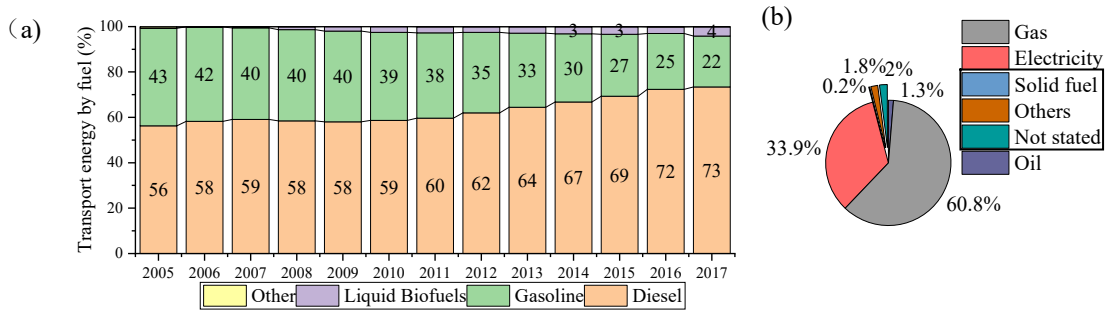


Figure S11. Contribution of diesel, gasoline, liquid biofuels and other fuels (a) to the total on-road transport energy in Ireland from 2005 and 2017 according to Sustainable Energy Authority of Ireland (SEAI, 2018) and the fraction of the households (b) that claimed to use natural gas, electricity, oil, solid fuels, others, and not stated in Dublin in 2016 according to Central Statistics Office (CSO, 2016). Solid fuel, *Others* and *Not stated* are highlighted to show the small fraction of households that are likely to use solid fuels for heating.

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