Supporting Information

Table S1. Mass concentrations of chemical components of particles inside and outside the residence during entire measuring period

<table>
<thead>
<tr>
<th></th>
<th>Indoor, 15.0 μg m⁻³</th>
<th>Outdoor, 7.0 μg m⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organic matter</td>
<td>NO₃</td>
</tr>
<tr>
<td>Average</td>
<td>13.5</td>
<td>0.3</td>
</tr>
<tr>
<td>STD</td>
<td>191.6</td>
<td>5.6</td>
</tr>
<tr>
<td>Maximum</td>
<td>1571</td>
<td>540.8</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>I/O ratio</td>
<td>5.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Indoors, 15.0 μg m⁻³

Outdoors, 7.0 μg m⁻³

I/O ratio
<table>
<thead>
<tr>
<th>Activity periods</th>
<th>Indoors, 16.7 µg m⁻³</th>
<th>Outdoors, 6.6 µg m⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Organic matter</td>
<td>NO₃</td>
</tr>
<tr>
<td>Average</td>
<td>15.3</td>
<td>0.3</td>
</tr>
<tr>
<td>STD</td>
<td>205.6</td>
<td>6.0</td>
</tr>
<tr>
<td>Maximum</td>
<td>15711.9</td>
<td>540.8</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>I/O ratio</td>
<td>6.7</td>
<td>0.1</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Non-activity periods</th>
<th>Indoors, 3.4 µg m⁻³</th>
<th>Outdoors, 9.5 µg m⁻³</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Organic matter</td>
<td>NO₃</td>
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<tr>
<td>Average</td>
<td>1.8</td>
<td>0.1</td>
</tr>
<tr>
<td>STD</td>
<td>0.7</td>
<td>0.1</td>
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<tr>
<td>Maximum</td>
<td>4.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>I/O ratio</td>
<td>0.5</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Figure S1. Sketch of the apartment
Figure S2 represents an organic mass spectrum of glycerin (C\textsubscript{3}H\textsubscript{8}O\textsubscript{3}) from NIST database. Vegetable glycerine (VG) is one of the main constituent in e-cigarette, which is added as humectant for vapour production from e-liquid. The NIST laboratory spectrum of glycerin is similar to the mass spectra of vaping of e-cigarette mass spectrum measured in the residence.

**Mass spectra from cooking events.** By analysing specific m/z’s from the average cooking mass spectrum using the PIKA software (not shown here), the organic mass spectrum was estimated to consist of 98% C\textsubscript{3}H\textsubscript{5} at m/z 41; 80% C\textsubscript{3}H\textsubscript{7} and 20% C\textsubscript{3}H\textsubscript{5}O\textsuperscript{+} at m/z 43; 65% C\textsubscript{4}H\textsubscript{7} and 35% C\textsubscript{4}H\textsubscript{5}O\textsuperscript{+} at m/z 55; 80% C\textsubscript{4}H\textsubscript{9} and 18% C\textsubscript{4}H\textsubscript{5}O\textsuperscript{2+} at m/z 60; 90% C\textsubscript{5}H\textsubscript{9}O\textsubscript{2} at m/z 73. The largest identified peaks for cooking organic aerosols were the same as those identified by \textsuperscript{94, 85, 93}. The major families of the AMS ion fragments were C\textsubscript{x}H\textsubscript{y}+, C\textsubscript{x}H\textsubscript{y}O\textsuperscript{+}, and C\textsubscript{x}H\textsubscript{y}O\textsuperscript{z+} (Figure 4A). Overall, the relative intensity of the C\textsubscript{3}H\textsubscript{5}+ ion class out of the total organic signal during cooking activities was 74%; for the C\textsubscript{4}H\textsubscript{9}O\textsuperscript{+} ion class was 20%; for the C\textsubscript{5}H\textsubscript{9}O\textsuperscript{2+} ion family, it was 6%.
Figure S3 illustrates the differences of the COAI and COAII factors obtained from PMF results. Both COA factor profiles had characteristic peaks at m/z's 41, 43, 55, 57, 60, 71 and 73. However, the main difference between two factors was that the intensity of m/z's 43, 55, 57, 60, 71 and 73 of COAI in comparison to COAII, in case of COAI they were less pronounced. The signals at m/z's 43, 55, 57, 71 represent unbranched-chain saturated hydrocarbons and long-chain fatty acids formed during cooking. The increased signals at m/z's 60 and 73 could appear due to specific type of cooking during which degradation of complex sugars into single ring sugars took place. Due to the lack of information from the activity logbook, we were not able to attribute COAII factor to specific type of food preparation.
Figure S4 shows the average outdoor mass spectra during the whole measurement campaign and mass spectra that represent outdoor contribution factor retrieved during PMF analysis. Both mass spectra show similar spectral pattern. It can be seen that not all the organic particle mass has penetrated inside (67 %) due to size dependent penetration through the building envelope. Additionally, it can be seen that the main difference between the mass spectra is a higher fraction of m/z 44 (CO$_2^+$). This is consistent with evaporation of more volatile species (which give a lower fraction of m/z 44). Furthermore, the time series is quite flat (see Figure 5B) which is consistent with penetration rather than formation from highly variable precursor concentrations. For these three reasons (mass spectral pattern, concentration and time series), we consider it likely that factor is indeed mainly due to outdoor penetration. However, there could be some contribution due to indoor sources as well, e.g. secondary aerosol formation. Due to the uncertainties introduced by the penetration and evaporation, a mass closure is not feasible.
Figure S5. Average indoor (A) and outdoor (B) mass spectra