-Supplementary information-

Characterization of Particulate Matter in Multizonal Residential Apartment: Transport, Exposure, and Mitigation

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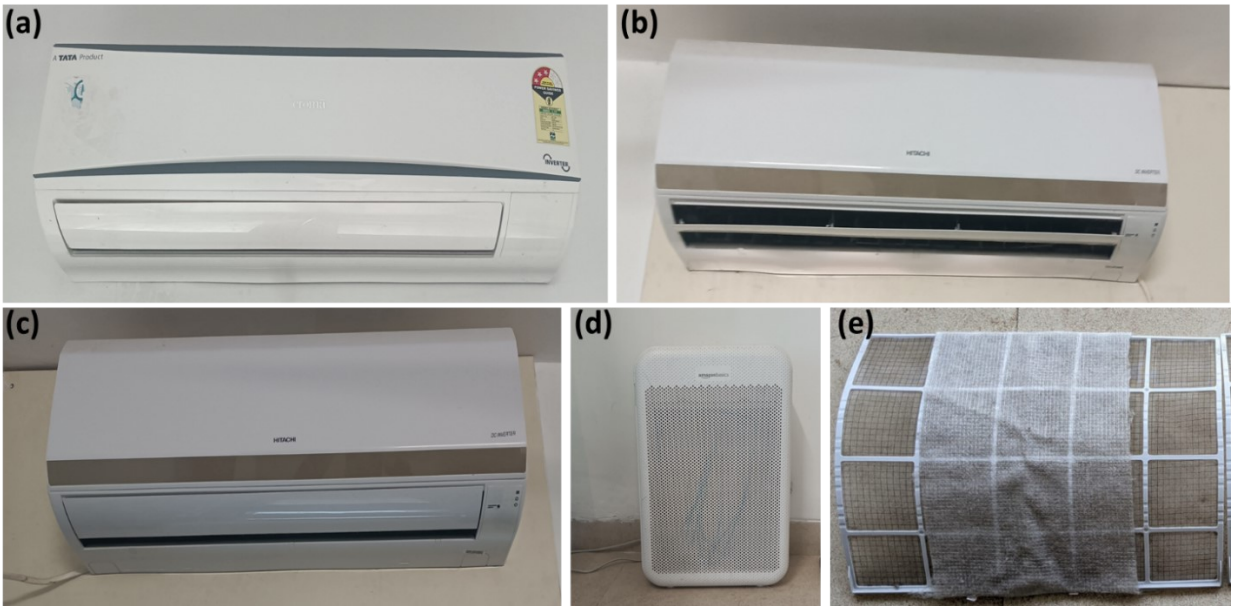

Figure S1: Pictures of ACs (air conditioners) installed in (a) living room, (b) BR 1, (c) BR 2, and other tested mitigation measures used during the experimental campaign, (d) PAC (portable air cleaner), and (e) filter sheets

Figure S2: Picture of cookstove in the kitchen using piped natural gas for cooking

Table S1: Different types of food cooked during the experimental campaign and their preparation methodology

Food	Cooking Methodology
Vegetable stir-fry	Stir-fried in oil
Utappam (pancakes with vegetables)	Shallow frying
Chickpea curry	Stir fry followed by boiling.
Idli (steamed rice cake)	Steaming
Scrambled eggs and chapati	Stir-fry and baking on stove-top iron pan
Scrambled cheese	Stir-fried in oil
Beans + shallow fry cheese	Shallow fried in stove-top pan
Paratha (Shallow-fried flatbread)	Shallow fried flatbread on stove-top iron pan
Bhature (Deep fried flatbread)	Deep fried flatbread in wok
Chips	Deep frying in oil
Roasting peanuts	Roasting on stove-top pan
Tempered vegetables	Oil tempering followed by slow cooking

Table S2: Sensor ID and location of the sensors inside the residential apartment

Specifics	Location	Sensor ID (SID)
Kitchen 1	Kitchen platform	SID9
Kitchen 2	Refrigerator top	SID4
LR 1	Dining Table	SID2
LR 2	TV Stand	SID10
LR 3	Near sofa	SID1
BR 1	Master Bedroom	SID8
BR 2	Guest Bedroom	SID6
SR	Study room	SID5
Balcony 1	Small balcony	SID3
Balcony 2	Large balcony	SID7

Section S2. Collocation and calibration of the low-cost air quality monitors (LC-AQMs)

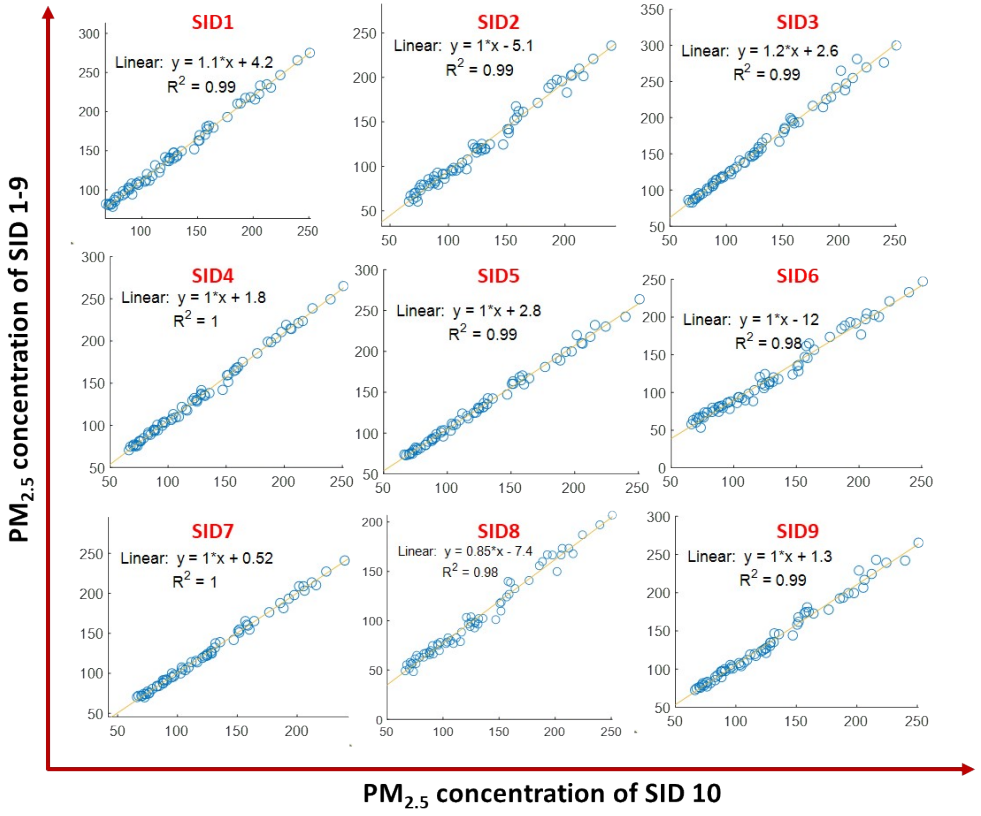

Figure S3: Calibration factor obtained for the nine units of LCAQMs (SID1-SID9) against the 10th unit (SID10) used as reference sensor from collocation experiments using incense as PM source

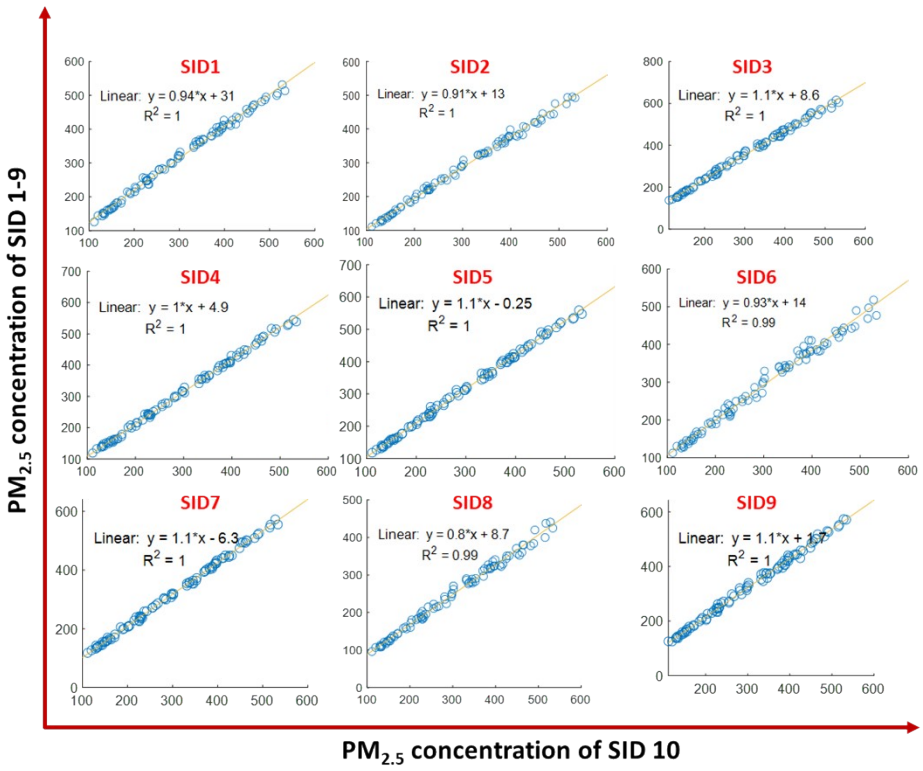

Figure S4: Calibration factor obtained for the nine units of LCAQMs (SID1-SID9) against the 10th unit (SID10) used as reference sensor from collocation experiments using cooking as PM source

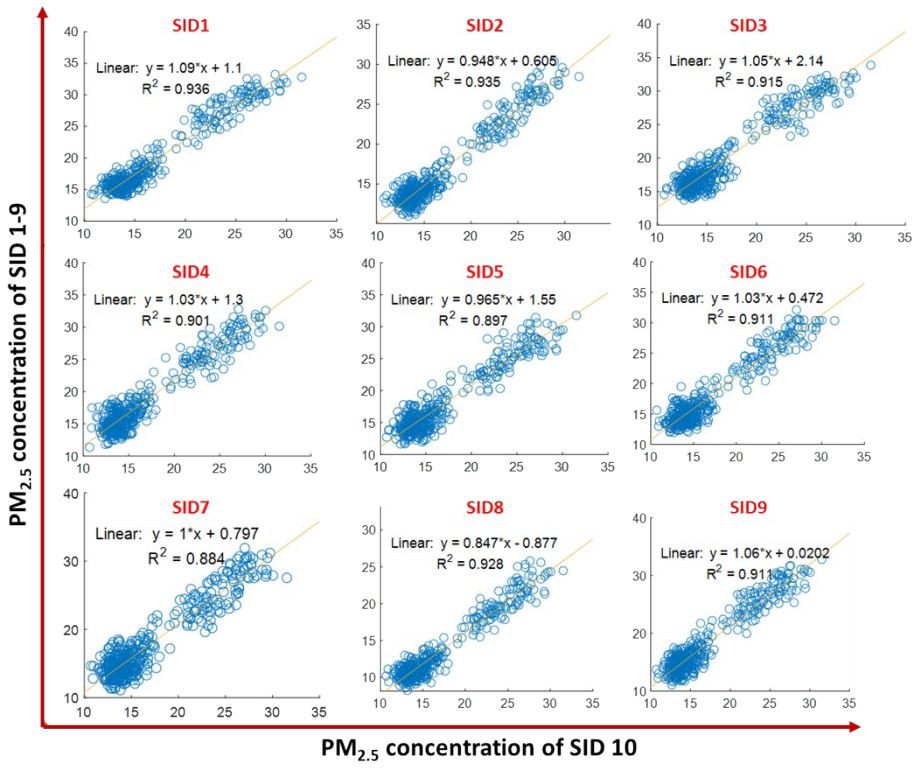

Figure S5: Calibration factor obtained for the nine units of LCAQMs (SID1-SID9) against the 10th unit (SID10) used as reference sensor from collocation experiments using background PM

Section S3. Results and Discussion

Table S3: Size-resolved average PM concentrations (μg/m^3) for different types of food cooked during the study period

Food	DustTrak 8533					PMS5003 based LC-AQM		
	PM_1	**$PM_{2.5}$**	**PM_4**	**PM_{10}**	**PM_{tot}**	**PM_1**	**$PM_{2.5}$**	**PM_{10}**
Vegetable stir-fry	758.4	806.6	838.3	912.4	977.0	106.2	214.2	289.1
Utappam (pancakes with vegetables)	93.8	96.3	99.2	110.0	126.4	41.04	62.2	71.8
Chickpea curry	162.1	168.0	174.7	196.9	222.6	48.21	75.1	86.3
Idli (steamed rice cake)	181.1	188.5	196.3	219.6	241.2	53.7	88.6	105.7
Scrambled eggs and chapati	158.3	164.0	170.4	191.2	208.7	48.9	76.17	89.8
Scrambled cheese	210.9	216.8	222.3	240.3	260.2	59.1	97.0	113.5
Beans + shallow fry cheese	113.9	116.9	119.7	129.1	141.6	35.8	54.5	64.0
Paratha (Shallow-fried flatbread)	263.4	271.4	275.8	282.6	294.8	161.1	322.3	393.2
Bhature (Deep fried flatbread)	1028.2	1033.9	1038.0	1045.8	1059.8	162.0	307.8	327.9
Chips	435.2	442.4	450.5	482.3	520.6	84.3	149.8	165.3
Roasting peanuts	89.4	91.1	93.4	105.0	125.7	32.0	45.8	49.4
Tempered vegetables	371.8	410.2	446.5	559.4	698.0	50.5	99.7	147.5

Fig. S6 shows the particle number size distribution (PNSD) and particle mass size distribution (PMSD) for two cooked meals ranked top among the foods with the highest average PM concentrations per Table S3. Fig. S6a and S6c show the elevated concentrations of sub-micron particles in the obtained PNSD relative to the background. Figs. S6b and S6d represent corresponding mass distribution plots that show dominance in sub-micron and super-micron regions attributed to cooking-generated aerosols.

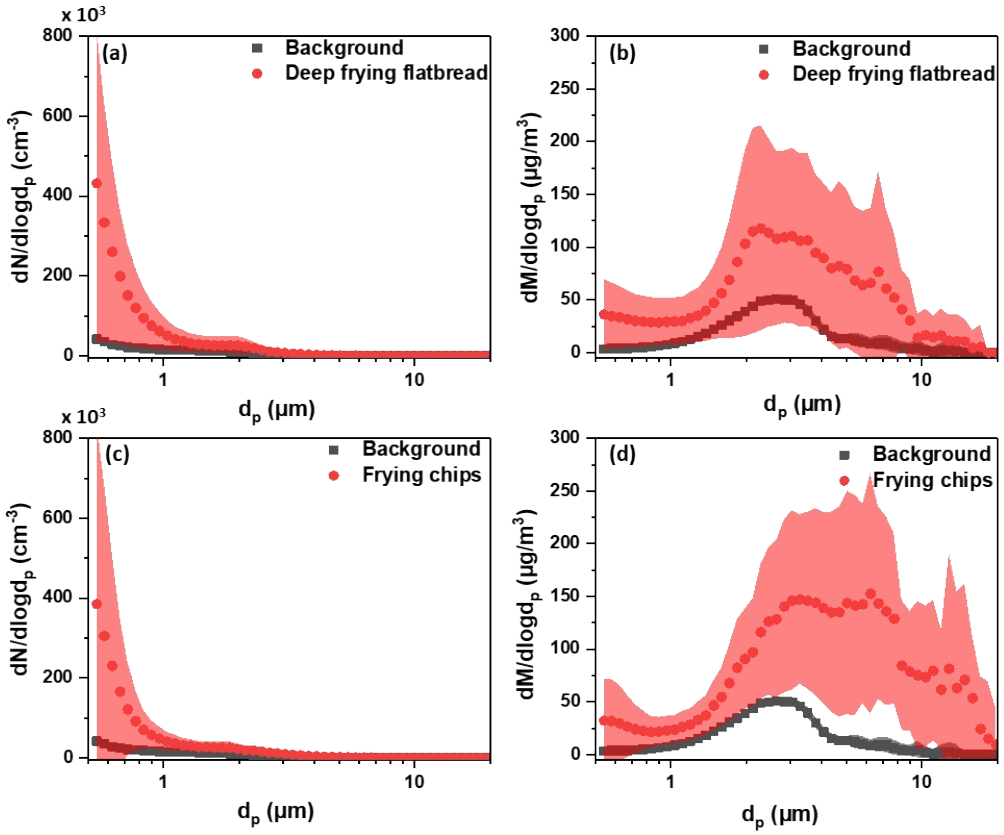

Figure S6: The left panel shows the particle number size distribution (PNSD), and the right panel shows the particle mass size distribution (PMSD) corresponding to (a, b) deep frying flatbread, and (c, d) frying chips

Fig. S7 shows the time it took to reach 2x, 3x, 4x, and peak relative to the background concentrations in three different apartment zones when the incense sticks were lit in the worship place instead of the kitchen. During AC operation, pollutants took less time to reach other sections of the house (BR 1, BR 2, and SR) than the 'w/o AC' case when compared across all the metrics (2x, 3x, 4x, and peak).

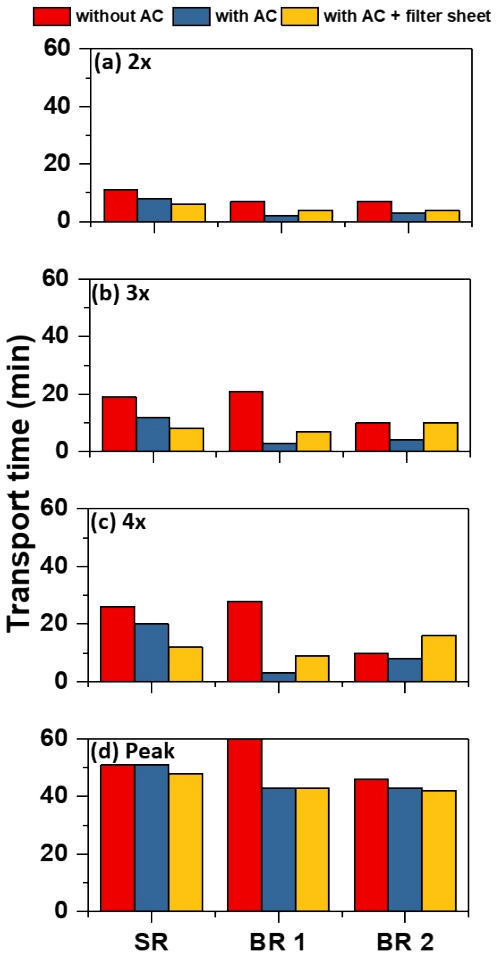

Figure S7: Time for the concentrations in the study room (SR), bedroom 1 (BR 1), and bedroom 2 (BR 2) to reach (a) 2x, (b) 3x, (c) 4x, and (d) peak relative to the background concentration under three scenarios: w/o AC, with AC on, and with AC on + filter sheet, when incense was kept in the worship place

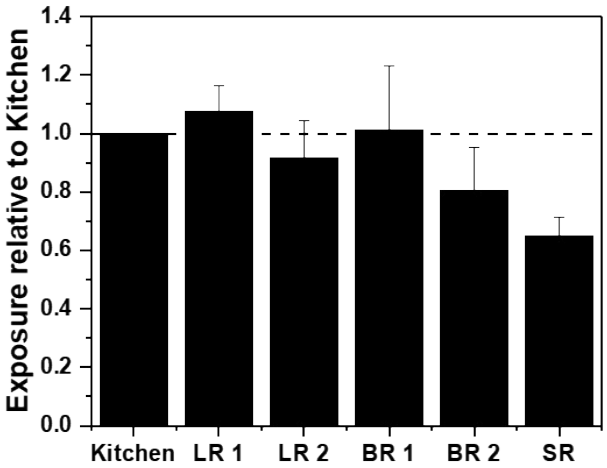

Figure S8: Exposure relative to kitchen occurred during incense lighting at two locations in the living room (LR 1 and LR 2), bedroom 1 (BR 1), bedroom 2 (BR 2), and study room (SR)

The average 60 min exposure estimated relative to the kitchen was highest in LR 1 (1.08±0.09), followed by BR 1 (1.01±0.22), LR 2 (0.92±0.13), BR 2 (0.81±0.15), and SR (0.65±0.07).

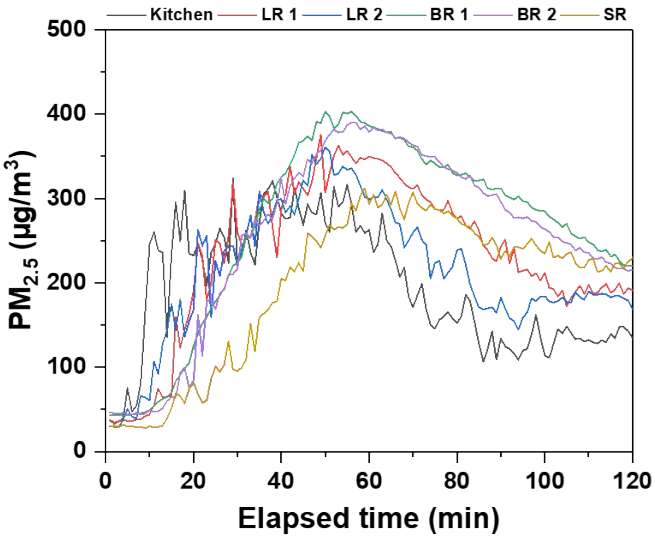

Figure S9: $PM_{2.5}$ concentration evolution over 120 minutes in all the zones of the apartment when no PAC was used

Figure S10: (a) AC pre-filters attached with additional filter sheet (b) filter sheet before and after AC operation (Before: small square white patch; After: black filter sheets on both the pre-filters)

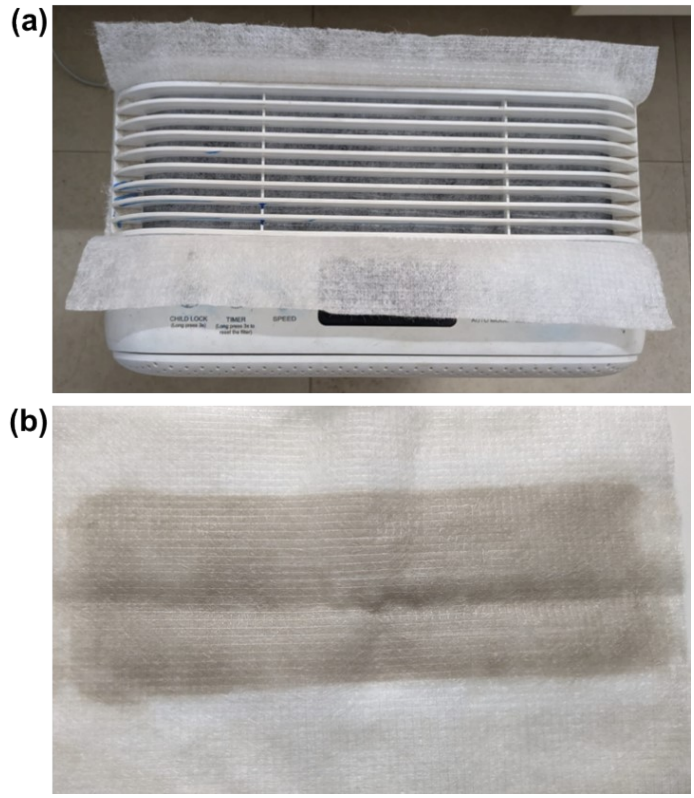

Figure S11: (a) PAC with additional filter sheet on top of it and (b) the filter sheet after use showing PM accumulation in the cross-section area that overlapped with the PAC outlet