



**Influence of occupants' activities on airborne
particle concentrations and characteristics indoors
sources of particles, role of kitchen hoods**

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Airborne particles in indoor environments

- Penetration from outdoors, which depends on
 - ✓ outdoor concentrations
 - ✓ ventilation type, filtration type (if any)
 - ✓ type of the building, tightness of the building envelope
 - ✓ airing practices
- Indoor sources (particles emitted directly or formed from gases), which depend on
 - ✓ Human activities
 - ✓ Frequency and intensity of the activities
 - ✓ Ventilation/kitchen hood use and its efficiency/airing practices

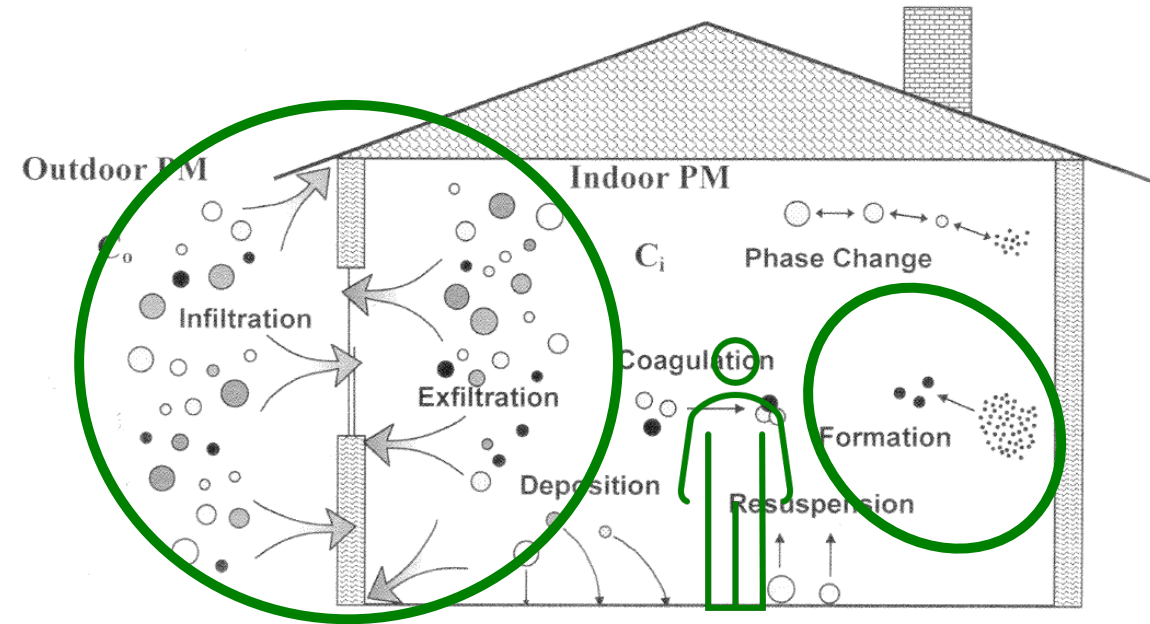


Figure 3. Schematic of particle transport, transformation, and removal processes in the indoor environment.

From: Thatcher et al., 2003, Aerosol Science and Technology, Vol. 37, No. 11, p.847-864



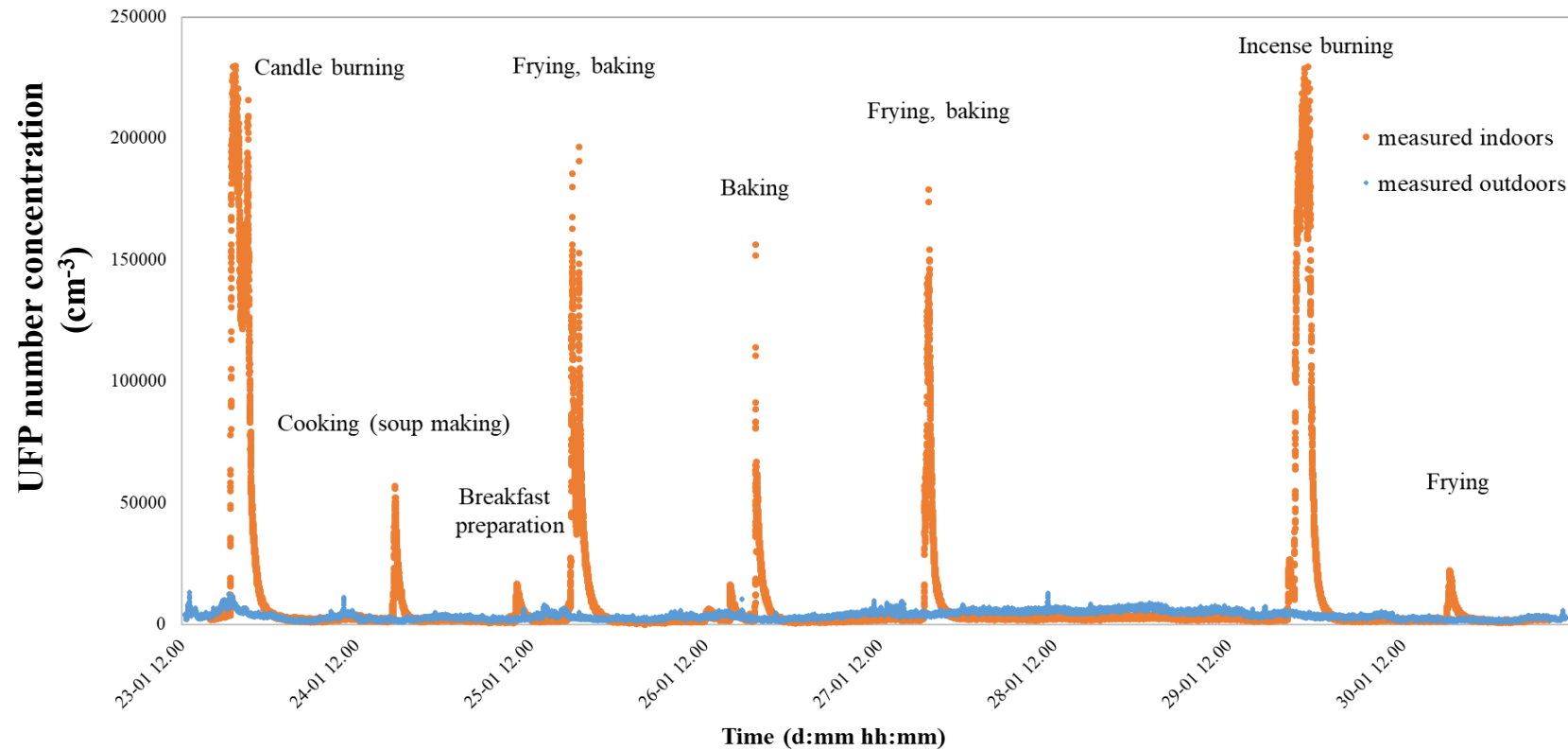
Indoor sources of airborne particles - examples



**New
products**



UFP number concentrations – indoors and outdoors

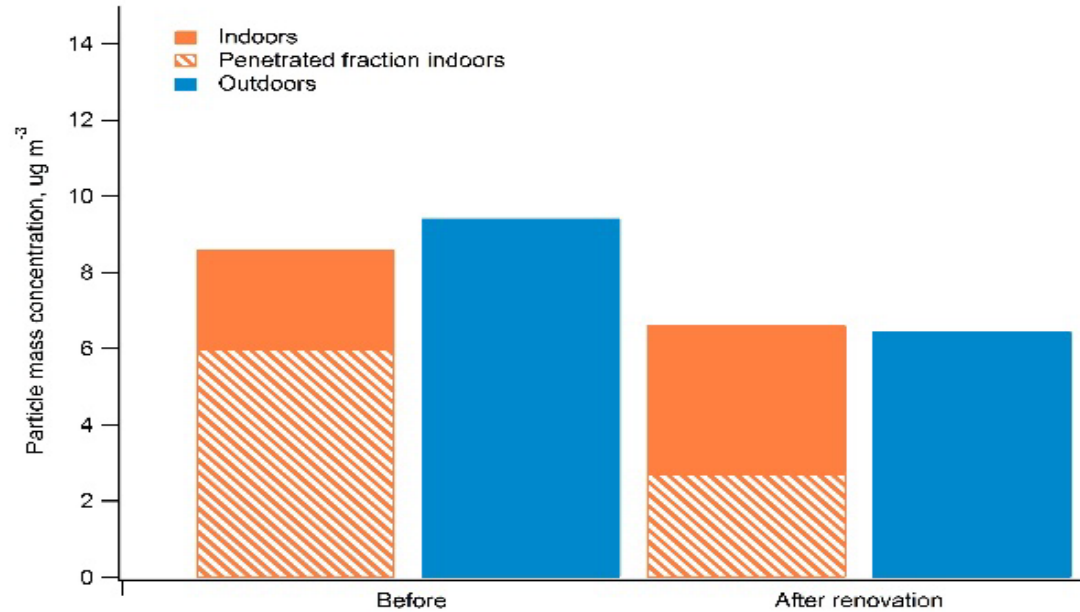


Omelekhina et al., in prep

Cooking and candle burning are dominating contributors to UFP particle number concentrations indoors

Contribution of indoor source to the residential daily UFP exposure accounts to 65% (Isaxon et al 2015, Bekö et al 2013)

Energy renovation, occupants and role of kitchen hoods



Concentration of particles indoors after energy renovations

- Decreased penetration of outdoor particles
- Increased influence of indoor sources on airborne particles concentrations



Kitchen hoods

- Their efficiency varies between 30% (!) and 98%
- Not integrated/automated with stove and oven use, require active switching on by the user
- Too loud – users choose not to use it
- Design (?)
- Recirculation – not suitable in kitchen
- If efficient and integrated with ventilation system can be simple and excellent way to remove particles when needed (on demand)



Main messages

- Indoors we are exposed not only to particles of outdoor origin
- Several indoor sources contribute to high particle loads
- Energy renovations increase influence of indoor sources of particle
- Kitchen hoods if efficient and properly incorporated in ventilation system can be an effective tool to remove particles from indoors

