Roles of the human occupant in indoor chemistry - DTU Orbit (09/11/2017)

Roles of the human occupant in indoor chemistry

Over the last decade, influences of the human occupant on indoor chemistry have been investigated in environments ranging from simulated aircraft cabins to actual classrooms. We have learned that ozone reacts rapidly with constituents of skin surface lipids on exposed skin, hair, and clothing, substantially reducing indoor ozone concentrations but increasing airborne levels of mono-and bifunctional compounds that contain carbonyl, carboxyl, or alpha-hydroxy ketone groups. Moreover, occupants transfer skin oils to and shed skin flakes (desquamation) onto indoor surfaces. Evidence for the presence of skin flakes/oils has been found in airborne particles, settled dust, and wipes of indoor surfaces. These occupant residues are also anticipated to scavenge ozone and produce byproducts. Under typical conditions, occupancy is anticipated to decrease the net level of oxidants in indoor air. When occupants scavenge ozone, the level of SOA derived from ozone/terpene chemistry decreases; the fraction of SVOCs in the gas-phase increases, and the fraction associated with airborne particles decreases. Occupants also remove organic compounds, including certain chemically active species, via bodily intake. Studies reviewed in this paper demonstrate the pronounced influences of humans on chemistry within the spaces they inhabit and the consequences of these influences on their subsequent chemical exposures.

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