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Indoor Ozone/Terpene Reactions in an Apartment under normal Conditions

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The objective was to test the hypothesis that indoor ozone/terpene reactions contribute significant to indoor particle concentrations under normal conditions.

The two-room apartment with exhaust ventilation was uninhabited, but fully furnished. Most of the air was supplied via a 15-cm^2 opening in the window in the living room facing the busy street. The indoor air pollutants and environmental conditions were monitored with half-hour average values over a one-month period except the VOCs that were monitored with 2-hours average values over a two-days period. The indoor particle concentrations were monitored with a differential mobility analyzer. Indoor ozone concentrations were monitored with UV photometric ozone analyzer. VOCs were sampled on Tenax TA and analyzed with thermal desorption and gas chromatography.

The temperature was 22-25 ˚C and the relative humidity was 32-40 %RH with almost no diurnal variation. The average daytime air exchange rate was 0.7-0.8 h^{-1} and the average nighttime rate (midnight to 7 am) was 0.3-0.4 h^{-1}. The indoor ozone concentrations were at the detection limit of the instrument. However, the average nighttime (midnight to 5 am) concentration (ca. 3 ppb) had a tendency to be higher (in spite of the decreased ventilation rate) than the average daytime concentration (ca. 0.1 ppb) except in the weekend. This may reflect higher outdoor air (the source) ozone concentrations that may be due to decreased traffic (low concentration of NO). The concentrations of carene and limonene were approximately constant during daytime and were increasing during nighttime (midnight to 5 am). This reflects constant in-

door sources of these terpenes. Particles with an aerodynamic diameter 190-700 nm had peak concentrations during nighttime (midnight to 5 am). This pattern was not pronounced for particles below 190 nm.

These observations do not contradict the hypothesis and might partly reflect deposition of high boiling reaction products on existing particles.