Environ Health Perspect

DOI: 10.1289/EHP9413

Supplemental Material

Effect of Atmospheric Aging on Soot Particle Toxicity in Lung Cell Models at the Air–Liquid Interface: Differential Toxicological Impacts of Biogenic and Anthropogenic Secondary Organic Aerosols (SOAs)

Svenja Offer, Elena Hartner, Sebastiano Di Bucchianico, Christoph Bisig, Stefanie Bauer, Jana Pantzke, Elias J. Zimmermann, Xin Cao, Stefanie Binder, Evelyn Kuhn, Anja Huber, Seongho Jeong, Uwe Käfer, Patrick Martens, Arunas Mesceriakovas, Jan Bendl, Ramona Brejcha, Angela Buchholz, Daniella Gat, Thorsten Hohaus, Narges Rastak, Gert Jakobi, Markus Kalberer, Tamara Kanashova, Yue Hu, Christoph Ogris, Annalisa Marsico, Fabian Theis, Michal Pardo, Thomas Gröger, Sebastian Öder, Jürgen Orasche, Andreas Paul, Till Ziehm, Zhi-Hui Zhang, Thomas Adam, Olli Sippula, Martin Sklorz, Jürgen Schnelle-Kreis, Hendryk Czech, Astrid Kiendler-Scharr, Yinon Rudich, and Ralf Zimmermann

Table of Contents

Figure S1. Stability of β-pinene and naphthalene aging, respectively over 4 h exposure time measured with different methods and on different days (**A**) organic content measured by AMS (**B**) black carbon (BC) measured by Aethalometer (**C**) d9-butanol measured by PTR-MS (**D**) ozone measured by an ozone monitor (**E**) PN and (**F**) size distribution measured by SMPS. (**A-E**) Results are shown of one representative exposure with either $SOA_{\beta PIN}$-SP, SOA_{NAP}-SP or with SP (**E-F**), respectively. All exposures were conducted on different days. Corresponding numeric data are found in Excel Tables S1-S6, respectively. Note: SOA_{NAP}-SP/$SOA_{\beta PIN}$-SP, soot particles (SP, CAST soot; 1 mg m^{-3}) together with either naphthalene or β-pinene (4 mg m^{-3}) photochemically aged with OH radicals in a potential aerosol mass reactor, SP; pure SP (CAST soot; 1 mg m^{-3}) were fed into the potential aerosol mass reactor without aging; AMS, high-resolution time-of-flight aerosol mass spectrometer; PTR-MS, quadrupole proton-transfer reaction mass spectrometer; SMPS, scanning mobility particle sizer.

Figure S2. TEM micrographs of SP, SOA_{NAP}-SP and $SOA_{\beta PIN}$-SP. Representative TEM micrographs of 1 mg m^{-3} SP (**A**), photochemically-aged SP (1 mg m^{-3}) coated by naphthalene (4 mg m^{-3}, SOA_{NAP}-SP) (**B**) and β-pinene (4 mg m^{-3}, $SOA_{\beta PIN}$-SP) (**C**) aging products, scale bar 200 nm. Note: TEM, Transmission electron microscopy; SP; pure SP (CAST soot; 1 mg m^{-3}) were fed into the potential aerosol mass reactor without aging; SOA_{NAP}-SP/$SOA_{\beta PIN}$-SP, soot particles (SP, CAST soot; 1 mg m^{-3}) together with either naphthalene or β-pinene (4 mg m^{-3}) photochemically aged with OH radicals in a potential aerosol mass reactor.

Figure S3. GC×GC-TOFMS contour plots for $SOA_{\beta PIN}$-SP (**A**) and SOA_{NAP}-SP (**B**). Note: GC×GC-TOFMS, comprehensive two-dimensional gas chromatography - time-of-flight mass spectrometer; SOA_{NAP}-SP/$SOA_{\beta PIN}$-SP, soot particles (SP, CAST soot; 1 mg m^{-3}) together with either naphthalene or β-pinene (4 mg m^{-3}) photochemically aged with OH radicals in a potential aerosol mass reactor.

Figure S4. Relative cumulative abundance of the 100 peaks with the highest intensities in GC×GC-TOFMS (ranked from compounds with highest to lowest areas). Compounds were identified via NIST mass spectral library match and retention indices for (**A**) SOA_{NAP}-SP and (**B**) $SOA_{\beta PIN}$-SP. Processing was done with a minimum peak S/N of 1000. Compounds marked in red were detected in both aerosol types. The numeric data corresponding to this figure is shown in the column cumulative abundance [%] of Table S1 for SOA_{NAP}-SP and of Table S2 for $SOA_{\beta PIN}$-SP. Note: SOA_{NAP}-SP/$SOA_{\beta PIN}$-SP, soot particles (SP, CAST soot; 1 mg m^{-3}) together with either naphthalene or β-pinene (4 mg m^{-3}) photochemically aged with OH radicals in a potential aerosol mass reactor; GC×GC-TOFMS, comprehensive two-dimensional gas chromatography - time-of-flight mass spectrometer.

Figure S5. Diagram of the relative AMS intensity fraction of m/z 43 vs m/z 44 (f_{44} vs. f_{43}) for $SOA_{\beta PIN}$-SP and SOA_{NAP}-SP. Corresponding numeric data are shown in Table S5. Note: AMS, high-resolution time-of-flight aerosol mass spectrometer; SOA_{NAP}-SP/$SOA_{\beta PIN}$-SP, soot particles (SP, CAST soot; 1 mg m^{-3}) together with either naphthalene or β-pinene (4 mg m^{-3}) photochemically aged with OH radicals in a potential aerosol mass reactor.

Additional File- Excel Document