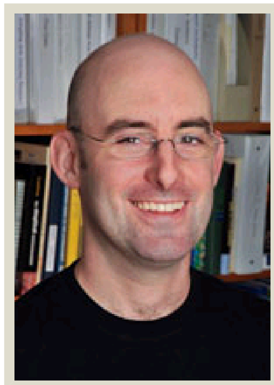
Department of
Civil & Environmental Engineering
Massachusetts Institute of Technology

- Faculty
  - Lecturers
  - Researchers
  - Postdocs
  - Staff

- Printer-friendly version

Faculty - Jesse H. Kroll



Jesse H. Kroll

Associate Professor of Civil and Environmental Engineering

Associate Professor of Chemical Engineering

MIT
Parsons Laboratory
Room 48-323
15 Vassar Street
Cambridge, MA, 02139

Telephone: 617.253.2409
Email: jhkroll@mit.edu
Research Website: http://krollgroup.mit.edu/index.htm
Assistant: Jacqueline Foster / jafoster@mit.edu

Education

- A.B. 1996 Harvard College
- A.M. 1999 Harvard University
- Ph.D 2003 Harvard University

Research Interests

Our research involves the experimental study of the properties and chemical transformations of organic species in the Earth's atmosphere. Atmospheric organics play several roles of central importance to environmental science: they affect air quality by forming secondary pollutants such as ozone; they make up a large fraction of particulate matter, with serious implications for human health and climate; and they exchange with other domains in the environment (oceans, soils, etc.), influencing biogeochemical cycles and the distribution of pollutants. A detailed understanding of these effects requires an improved characterization of the sources and evolution of atmospheric organics. Towards this end, our research group is involved in two general (and closely related) areas of research:

- The development of new analytical tools for the measurement and characterization of organics in both the gas and condensed phases; and
- The use of these tools in the laboratory and the field, in order to better constrain the amount, nature, and chemical evolution of atmospheric organics.

Teaching Interests

1.013 Senior Civil and Environmental Engineering Design

1.080 Environmental Chemistry and Biology

1.092 TREX: Traveling Research Environmental eXperience

1.107 Environmental Chemistry and Biology Laboratory

1.84J/10.817/12.807 Atmospheric Chemistry

Selected Publications

1. J. H. Kroll, Neil M. Donahue, J. L. Jimenez, S. H. Kessler, M. R. Canagaratna, Kevin R. Wilson, K. E. Altieri, L. R.Mazzoleni, A. S. Wozniak, H. Bluhm, E. R. Mysak, J. D. Smith, C. E. Kolb and D. R. Worsnop (2011). "Carbon oxidation state as a metric for describing the chemistry of atmospheric organic aerosol", *Nature Chemistry*, 3: 133-139.
2. S.H. Kessler, T. Nah, A.J. Carrasquillo, J.T. Jayne, D.R. Worsnop, K.R. Wilson, and J.H. Kroll (2011). " Formation of Secondary Organic Aerosol from the Direct Photolytic Generation of Organic Radicals ". *J. Phys. Chem. Lett.*, 2: 1295-1300.
3. C.L. Heald, J.H. Kroll, J.L. Jimenez, K.S. Docherty, P.F. DeCarlo, A.C. Aiken, Q. Chen, S.T. Martin, D.K. Farmer, P. Artaxo, and A.J. Weinheimer (2010). "A simplified description of organic aerosol elemental composition", *Geophysical Research Letters*, Vol. 37, L08803, doi:10.1029/2010GL042737.
4. S.H. Kessler, J.D. Smith, D.L. Che, D.R. Worsnop, K.R. Wilson, and J.H. Kroll (2010). " Chemical Sinks of Organic Aerosol: Kinetics and Products of the Heterogeneous Oxidation of Erythritol and Levoglucosan ". *Environmental Science & Technology*, 44: 7005-7010.
5. J.H. Kroll, J.D. Smith, D.L. Che, S.H. Kessler, D.R. Worsnop, and K.R. Wilson (2009). "Measurement of fragmentation and functionalization pathways in the heterogeneous oxidation of oxidized organic aerosol", *Physical Chemistry Chemical Physics*, 11: 8005-8014.
6. Jimenez, J.L., M.R. Canagaratna, N.M. Donahue, A.S.H. Prevot, Q. Zhang, J.H. Kroll, et al. (2009), "Evolution of Organic Aerosols in the Atmosphere". *Science*, 326(5959): p. 1525-1529.
7. J.H. Kroll and J.H. Seinfeld (2008). "Chemistry of secondary organic aerosol: Formation and evolution of low-volatility organics in the atmosphere", *Atmospheric Environment*, 42: 3593-3624.

Massachusetts Institute of Technology Department of Civil and Environmental Engineering
77 Massachusetts Avenue, Room 1-290 ▪ Cambridge, MA 02139-4307 ▪ (617) 253-7101