

## Chemical kinetics of fuel-bound nitrogen below the thermal NO<sub>x</sub> limit

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Low-temperature compression-ignition engines represent a new class of internal combustion engines that could meet stringent fuel economy and emissions requirements. One common approach to improve the performance of these engines is through the use of fuel additives, such as alkyl nitrates. Empirical results indicate that only one third of the fuel-bound nitrogen in these nitrates exits the cylinder as NO<sub>x</sub>. These results raise a fundamental and potentially troubling question: what happens to fuel-bound nitrogen in low-temperature combustion? This seminar will cover work by the Goldsmith Group on the chemical kinetics of alkyl nitrates below the thermal NO<sub>x</sub> limit.

Franklin Goldsmith joined the School of Engineering at Brown University in January, 2014. His research focuses on theoretical, computational, and experimental quantification of reaction rate constants in energy conversion systems. Most of the Goldsmith Group's work is in combustion chemistry, but the group also is active in heterogeneous catalysis, energetic materials, propellants, and atmospheric chemistry. Goldsmith received a B.A. in Philosophy from the University of North Carolina, a B.S. in both Chemical Engineering and Applied Mathematics from North Carolina State University, and was a Fulbright Scholar in Mathematics in Freiburg, Germany. He obtained his Ph.D. in Chemical Engineering from the Massachusetts Institute of Technology. Goldsmith spent two years in Berlin as an Alexander von Humboldt Scholar in Inorganic Chemistry at the Fritz-Haber Institute of the Max Planck Society, followed by one year as an Argonne Director's Fellow in Theoretical Chemistry at Argonne National Laboratory.

