

## *They Bend Before They Break: Fast Scission of Chemical Bonds*

Featured in the President's FY 2006 Budget Request to Congress  
(DOE/Science/Basic Energy Sciences/Chemical Sciences, Geosciences, and Biosciences)

Bond-breaking reactions in liquid solution which are so fast that the rates could not previously be measured, have recently been studied at the new picosecond Laser-Electron Accelerator Facility (LEAF) at Brookhaven National Laboratory. A large class of molecules known as aryl halides was studied, in which a halogen atom, such as chlorine or bromine, dissociates from a sizable planar ring structure, breaking its bond. The newly measured rates can only be explained theoretically if the bond breaks by the halogen atom bending out of plane by about 30 degrees before bond breaking, in a bent transition state. Such fundamental knowledge of the reaction mechanism may lead to improvements in energy efficiency and fewer toxic by-products in large-scale industrial processing.

For details see: *Faster Dissociation: Measured Rates and Computed Effects on Barriers in Aryl Halide Radical Anions* N. Takeda, P. V. Poliakov, A. R. Cook, and J. R. Miller, *J. Am. Chem. Soc.* **126**, 4301-4309 (2004).

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