

Organic Division Seminar



Prof. Stephen Craig
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Tuesday, February 9, 2010
3:30 p.m.
1315 Chemistry

Tension Can Be a Good Thing: Force-Induced Reactions and Their Consequences

The macroscopic forces typical of daily life (for example, those between a child's fingers) are many orders of magnitude greater than those between a pair of atoms in a covalent chemical bond. When appropriately coupled to an external force, molecules can therefore be "pulled" into reactions that are otherwise difficult or impossible. Several examples of force-induced reactions from organic and organometallic chemistry will be presented, along with mechanistic insights into the nature of the reactivity. The consequences of these reactions are quite diverse, and include examples of molecules that lengthen (due to covalent, rather than conformational, rearrangements) when pulled, molecules that undergo a net contraction when pulled (via a process that is reminiscent of azobenzene photoswitches), and polymers whose properties change either reversibly or irreversibly in response to their mechanical environment.