

## Distinguished Lecture Series

Tuesday, October 3, 2006

3:30 p.m.

Deans Auditorium  
Pfendler Hall

Reception to follow the lecture



### Miniature & Ambient Mass Spectrometers: Prospects for Environmental Science

**Graham Cooks**, *Henry B. Hass Distinguished Professor of Chemistry*; **Robert J. Noll**, *Associate Research Scientist*; and **Miriam Fico**, *Graduate Research Assistant*

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Mass spectrometry, long a major tool in environmental monitoring, is continuing to re-invent itself: two recent developments make this case with particular force in regard to environmental issues. They are 1) the development of new sample preparation and ionization methods that allow instantaneous analysis of samples without prior sample preparation and without introduction of the sample into the mass spectrometer. These ambient ionization methods, of which desorption electrospray ionization (DESI, *Science*, **306**, 471 (2004) and *Science* **311** 1566(2006)) is the main example, allow high throughput monitoring of solids, air, and water samples at rates of 1 sample/second with MS, high resolution MS and MS/MS characterization. The methodology applies to small inorganic and organic molecules and to large biomolecules. Typical applications include PAHs in water, drugs and drug metabolites in the environment and in biological fluids, and chemicals released into the environment. The method is applicable to complex solids and is being applied to biological constituents of geological cores, to the distribution of microorganisms and to other problems. The second development, 2), is that of hand portable mass spectrometers. These instruments have all the capabilities of lab-based mass spectrometers, including MS/MS capabilities. The design and construction of these instruments will be described as will their utilization for trace organic analysis in air and water for analytes including toxic industrial compounds.

The lecture will end with a demonstration of the capabilities of the portable instrument, including the detection of characteristic components in red wine.

### Drug Monitoring on Skin Surface

