SPECIAL

ANALYTICAL & ENVIRONMENTAL CHEMISTRY DIVISION and
ATMOSPHERIC CHEMISTRY PROGRAM SEMINAR

Jointly sponsored by the Department of Chemistry and Biochemistry,
CIRES, and the Environmental Program
Thursday, September 6, 2007
4:00 p.m.
CIRES Auditorium
University of Colorado, Boulder

Green Solvents in Sample Preparation

Charlotta Turner, Uppsala University, Department of Physical and Analytical Chemistry,
Analytical Chemistry, P.O. Box 599, SE-751 24 Uppsala, SWEDEN
www.analytisk.kemi.uu.se, E-mail: charlotta.turner@kemi.uu.se,
phone: +46 18 471 3681, fax: +46 18 471 3692

Interest in environmentally benign technologies is steadily increasing. In Green Chemistry, not only the selection of catalyst, but also the use of renewable feedstock and safe solvents and auxiliaries, is of great importance. Furthermore, a green process should be energy efficient and it should prevent the formation of wastes and byproducts, and aim at making non-toxic, biodegradable products. Water is a non-toxic and naturally occurring solvent that can replace organic solvents when used at higher temperatures and pressures. Supercritical carbon dioxide is another environmentally friendly solvent that has been established as a reaction and extraction solvent in many industries world-wide. Thermostable glucosidases harvested from hot environments are useful catalysts in hot-water processes. Extraction and enzymatic reaction processes using subcritical water and supercritical carbon dioxide as solvents will be discussed in an analytical point of view. In the examples given from our research group, renewable raw material are used as feedstock, for instance onion waste, birch bark and red cabbage, and high-value micro-composite drug- and food materials are produced from extracted components using "green and clean" supercritical fluid technology.

The uptake of isoprene on sulfuric acid films: A kinetic study of SOA formation via acid-catalyzed heterogeneous reactions

Brandon M. Connelly
Research Assistant - Tolbert Group
CIRES and The Department of Chemistry and Biochemistry
The University of Colorado at Boulder

Abstract

It is now recognized that liquid and solid aerosol particles have a strong impact on atmospheric chemistry, global climate, and air quality. A key finding in the last decade is that almost all tropospheric particles are internal mixtures of many components, with organics compromising 50% or more of the particle mass. Current predictions from models fall short of the observed organic mass. Recent laboratory studies indicate a potential acid-catalyzed heterogeneous pathway for SOA production from various VOCs, including the biogenically sourced compound isoprene. The uptake of isoprene has been measured, with initial uptake coefficient, gamma initial, of 0.001 on films with an 80 wt % or greater sulfuric acid content. The atmospheric implications of the observed uptake will be discussed.