

Executive Summary

Participants of the National Science Foundation sponsored workshop on “Sustainability and Chemistry” met in Arlington, VA from May 30 – June 1, 2006 to discuss challenges in achieving sustainability. They focused on the four major areas depicted in Figure 1; Energy, Green Chemistry and Processing, Environment, and Education. This report discusses the challenges workshop participants found in each major area, barriers to meeting those challenges, and the enabling research to meet those challenges.



Figure 1: Four major areas of importance in sustainability; energy, green chemistry/processing, education and environment. These areas were discussed at the NSF sponsored workshop on sustainability held in Arlington, VA from May 30-June 1, 2006.

Participants working in the area of *sustainable energy* call for meeting the clean air challenge of diminishing fossil fuels by **creating a carbon-neutral economy that will use solar energy and/or alternative feedstocks**. Participants working in the area of *green chemistry/processing* see opportunities for more efficient chemical reactions and fewer waste products in **research into tailorable and sustainable molecular building blocks for material synthesis**. Participants working in the area of *the environment* urge building on recent advances to obtain **a more detailed molecular and elemental understanding of the components of air, water, and soil**. Participants working in the area of *educational initiatives* see the need for industrial and academic chemistry communities to address sustainability issues while **educating chemistry students and the public in the importance and urgency of sustainability-related research**.

Participants see enabling research areas such as nanoscience, bioprocessing, and catalysis as important pathways to meeting the challenge of a sustainable society. Participants also urged further development of measurement science and cyber science tools.

The National Science Foundation and other funding institutions were encouraged to provide resources needed for chemistry-related research in sustainability. Flexible grant mechanisms, increased funding for instrument development and adaptation, new initiatives for workforce development, public education and engagement, and recognition that sustainability is a global issue demanding international collaboration emerged as priorities.