

# Sustainability in the chemical industry - grand challenges and research needs : a workshop report

National Academy Press - Sustainability in the Chemical Industry : Grand Challenges and Research Needs

Description: -

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 Photography, Artistic -- Exhibitions.  
 Drawing -- 19th century -- United States -- Exhibitions.  
 Hudson River School -- Exhibitions.  
 Landscape painting -- 19th century -- United States -- Exhibitions.  
 Landscape painting, American -- Exhibitions.  
 Luminism (Art) -- Exhibitions.  
 Nebraska -- History.  
 Water-supply -- Government policy -- Nebraska -- History.  
 Water resources development -- Nebraska -- History.  
 Hydrology -- Nebraska.  
 Water-supply -- Nebraska -- History.  
 Chemical industry -- Environmental aspects.  
 Environmental chemistry.  
 Chemistry -- Research.Sustainability in the chemical industry - grand challenges and research needs : a workshop report  
 -Sustainability in the chemical industry - grand challenges and research needs : a workshop report  
 Notes: Includes bibliographical references.  
 This edition was published in 2006



Filesize: 40.510 MB

Tags: #NAE #Website

## BES Reports

These Grand Challenges include life cycle analysis, renewable chemical feedstocks, and education, among others.

### Quo vadis energy sustainability?

These impacts include the consequences of material extraction, resource consumption, manufacturing processes, and end-of-life disposal or recycling. Six decades of investments have enabled AI advancements that bear impact on all aspects of society, from severe weather predictions to life-saving interventions. Promoting biofuels offsets the use phase impacts of gasoline, but their extraction and processing phases may still generate sizable environmental and social effects, depending on the feedstock type and agricultural system.

### 1. Introduction

Market research forecasts substantial expansion of green chemical markets. When it comes to process metrics, Roundtable members look for performance measures that 1 clearly link to company environment, health, and safety EHS and sustainability initiatives, 2 maintain the overall strength of the breadth of the 12 principles of green chemistry, 3 take a holistic approach to the range of EHS and sustainability factors associated with chemical manufacturing e. Catalysis Research of Relevance to Carbon Management.

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There should be few, if any, wasted atoms. Renewable Chemical Feedstocks Grand Challenge: Derive chemicals from biomass —including any plant derived organic matter available on a renewable basis, dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials. Toxicological Sciences 2018, 161 2 , 225-240.

## **Collaboration Across Disciplines for Sustainability: Green Chemistry as an Emerging Multistakeholder Community**

These are also three of the 12 principles of green chemistry first published in 1998. Journal of Industrial and Engineering Chemistry 2017, 53 , 134-142. Neuromorphic Computing — From Materials Research to Systems Architecture Roundtable The Office of Science, through its Offices of Basic Energy Science BES and Advanced Scientific Computing Research ASCR , convened a roundtable consisting of 20 national lab, university and industry experts to evaluate computing architectures that go beyond Moore's Law and mimic neuro-biological architectures.

### **BES Reports**

**BASIC RESEARCH NEEDS WORKSHOP ON Quantum Materials for Energy Relevant Technology** This report is based on a BES workshop on Basic Research Needs on Quantum Materials for Energy Relevant Technology, which was held on February 8-10, 2016. There is a need to examine this situation and attempt to map a path forward that is sustainable—which allows humanity to meet current environmental, economic, and societal needs without compromising the progress and success of future generations. We discourage manuscripts that a report incremental improvements in catalyst performance compared to existing literature and processes, b present results without clear evidence that the intrinsic catalyst activity data were obtained under kinetically controlled conditions eliminating mass transfer limitations, c do not clearly discuss the sustainability attributes, either qualitatively or quantitatively, for both the catalyst synthesis itself and the catalytic process studied, and d report only computational chemistry work such as quantum chemical calculations of electronic structures of molecules and chemical dynamics without validation from complementary experiments, either within the work or other publications.

### **6. Conclusions and Recommendations**

This Basic Energy Sciences Advisory Committee BESAC report summarizes the results of a Workshop on Science for Energy Technology on January 18-21, 2010, to identify the scientific priority research directions needed to address the roadblocks and accelerate the innovation of clean energy technologies. Of the 41 industry respondents, 26 indicated that they work in chemical manufacturing. Research and development needs in these areas include reducing production costs, increasing stability, and discovering catalysts with greater specificity.

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