

*processes*

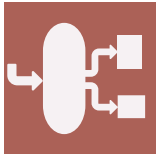
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# Section

Sustainable Processes



# *processes*



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## **Section Editor-in-Chief**

Prof. Dr. Valerio Cozzani

## **Section Information**

The Section Sustainable Processes of the journal *Processes* is the ideal forum for publishing significant research of high quality and high impact as well as good reviews. The concept of sustainability is based on three main pillars that relate to the societal, environmental, and economic impacts of production processes incorporating the Sustainable Development Goals defined by the United Nations. Today, the development and operation of industrial processes need to progressively incorporate sustainability objectives. This requires the development of sustainability metrics able to assess process performance and guide the selection of technology alternatives. On the other hand, new processes need to be developed improving the overall sustainability performance of supply chains and products. Submitted papers should embrace, for example, the proposal of innovative design methods for sustainability, innovative sustainability metrics, holistic approaches to assessing sustainability performance, and new, safe, as well as sustainable process technologies. Both fundamental research and industrial case studies are of interest to this Section. All manuscripts submitted for publication in this Section will undergo the usual high-quality peer review process of *Processes* and, if accepted, will be rapidly published online.

# **Section** Sustainable Processes

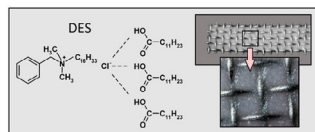
DOI:10.3390/pr10050828

### Deep Eutectic Solvent-Based Coating Sorbent for Preconcentration of Formaldehyde by Thin-Film Solid-Phase Microextraction Technique

Authors: Justyna Werner, Agnieszka Zgoła-Grzeškowiak and Tomasz Grzeškowiak



Abstract: A thin-film solid-phase microextraction method with a sorbent composed of a deep eutectic solvent was developed for the preconcentration of formaldehyde from river and lake water samples. Four new deep eutectic solvents (DESs) were synthesized, each in molar ratios 1:1, 1:2, and 1:3. Among prepared compounds, the greatest efficiency in the proposed method of preconcentration of formaldehyde derivatized with Nash reagent was demonstrated by DES-3 consisting of benzyldimethylhexadecylammonium chloride and lauric acid, in a molar ratio of 1:3. For the proposed method, the parameters affecting the extraction efficiency of formaldehyde were optimized (including the choice of DES-based sorbent and desorption solvent as well as the sample volume and pH, the salting-out effect, the extraction time, and the desorption time). Under optimal conditions, the proposed method achieved good precision between 3.3% (for single sorbent) and 4.8% (for sorbent-to-sorbent) as well as good recovery ranging from 78.0 to 99.1%. The limits of detection and quantitation were 0.15 ng mL<sup>-1</sup> and 0.50 ng mL<sup>-1</sup>, respectively. The enrichment factor was equal to 178. The developed method was successfully applied to determine formaldehyde in environmental water samples.



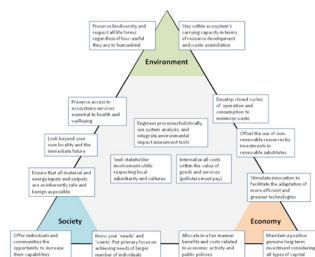
DOI:10.3390/pr10050870

### Updated Principles of Sustainable Engineering

Author: Peter Glavič



Abstract: A change in human development patterns is needed, including mankind's environmental, economic, and social behavior. Engineering methods and practices have a substantial impact on the way to sustainable development. An overview of the guiding principles of sustainability, sustainable design, green engineering, and sustainable engineering is presented first. Sustainable engineering principles need to be updated to include the present state of the art in human knowledge. Therefore, the updated principles of sustainable development are presented, including traditional and more recent items: a holistic approach, sustainability hierarchies, sustainable consumption, resource scarcity, equalities within and between generations, all stakeholders' engagement, and internalizing externalities. Environmental, social, and economic impacts that respect humans' true needs and well-being are of importance to the future. The updated 12 principles include the tridimensional system's approach, precautionary and preventive approaches, and corporate reporting liability. The environmental principles comprise a circular economy with waste minimization, efficient use of resources, increased share of renewables, and sustainable production. The social pillar includes different views of equality, the engagement of stakeholders, social responsibilities, and decent work. Economic principles embrace human capital, creativity, and innovation in the development of products, processes and services, cost-benefit analysis using the Life Cycle Assessment, and the polluters must pay principle. The principles will require further development by engaging individual engineers, educators, and their associations.



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