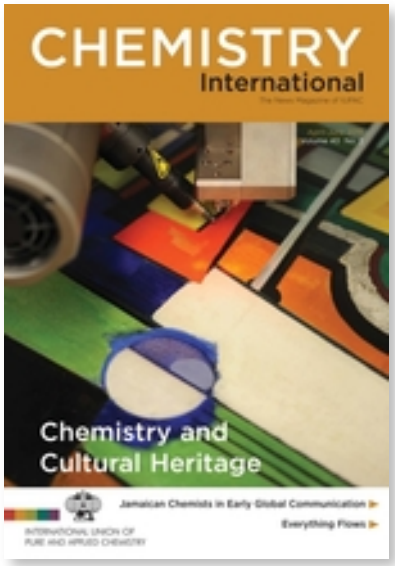

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Self-Healing Materials: An Alternative Approach to 20 Centuries of Materials Science

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Self-Healing Materials: An Alternative Approach to 20 Centuries of Materials Science

Springer Series in Materials Science, Vol. 100, 2007

Zwaag, Sybrand van der (Ed.)

ISBN: 978-1-4020-6249-0

As a result of the pathbreaking First International Conference on Self-Healing Materials, a distinguished group of experts was invited to contribute a chapter to the textbook Self-Healing Materials: An Alternative Approach to 20 Centuries of Materials Science, published by Springer. This book, the first in this new field of materials science, aims to present a coherent picture of design principles and resulting properties of self-healing materials over all material classes, and to offset them to the current design principles for structural materials with improved mechanical properties.

Tab. 

The First International Conference on Self Healing Materials <www.selfhealingmaterials.nl>, organized by the Delft Centre for Materials and sponsored by IUPAC, was held 18 to 20 April 2007 in Noordwijk aan Zee, the Netherlands. The event featured over 80 speakers from 5 continents and was attended by more than 200 participants. Chairmen of the conference were S. White (University of Illinois, USA) and S. van der Zwaag (Delft University of Technology).

Tab. 

Although the phenomenon of self-healing has been recognized in materials throughout history, especially with regards to biological systems, it was only recently that the property of self-healing was seriously considered as a desirable function for man-made materials. Beginning with the first successful incorporation of self-healing functionality in an (man-made) epoxy-system via micro encapsulation at the University of Illinois, research groups throughout the world have started to explore concepts and materials systems that impart self-healing properties for a variety of applications.

The conference was organized to gather and benefit from the insights gathered thus far in this intriguing new field. The expansive scope of the field is reflected in the topics represented at the conference:

- asphaltic materials
- bio-inspired technical materials
- cementitious materials

- composites and hybrids
- metals
- paints and other coatings
- structural polymers
- biological systems
- theoretical models related to self-healing
- characterization of self-healing behavior

An exciting opening lecture on the “Future of Autonomic Materials Systems” by Scott White, University of Illinois at Urbana-Champaign, introduced new ideas about how autonomic materials systems will provide self-sensing, regrowth, and other biologically inspired functions.

Tab. 

Peter Fratzl, Max Planck Institute of Colloids and Interfaces, Potsdam, Germany, reported about “Self-Repair in Bone Tissue, Plasticity, Remodelling, Healing.” He explained the fundamental differences between the design of natural materials and engineered materials. Nature adapts constantly to changing conditions during its whole life time. Explaining the self-repair of bones as a typical example occurring in nature, principles and strategies can be understood and adapted to engineering material systems.

Other lecture subjects included “Particle-Filled Microcapsules to Repair Damaged Substrates” by Anna Balazs, “Self-Healing Fibre Reinforced Polymer Composites” by Ian Bond, “Self-Healing in Concrete Materials” by Victor Li, “Self-Healing of Thermosetting Resins” by F. Jones, “Self-Healing in Metals” by R. Lumley and H. Wang, and “Mechanisms of Healing in Asphalt Mixtures” by D. Little.

The Second International Conference on Self-Healing Materials will be held 28 June to 1 July 2009 at The Westin Chicago River North in downtown Chicago, Illinois, USA. Building on the success of the first conference, an even larger turnout is expected. The site is a four-star hotel along the Chicago River within walking distance of the Magnificent Mile shopping district, Navy Pier, Millennium Park and other Chicago sites.More information is available on the conferecen website, concerning registration, abstract submission, hotel accommodations, tours, and additional conference details. Scott White and Ian Bond are the conference co-chairs.http://conferences.beckman.uiuc.edu/ICSHM2009/

www.springer.com/chemistry/polymer/book/978-1-4020-6249-0

About the article

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