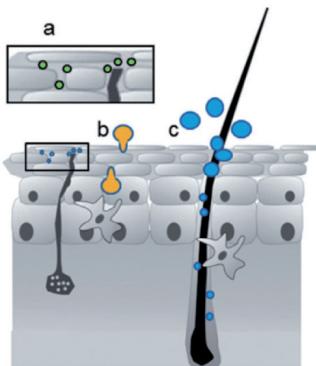


## Special Edition: Nanobiotechnology

### News

#### Nanoparticles for transcutaneous vaccination



Could nanotechnology prevent one-third of all deaths caused by infections? Many of these deaths are due to the lack of efficient prophylaxis and treatment options owing to the unavailability of vaccines and antibiotics or due to the development of drug resistances. Thus, it is of upmost importance to develop strategies for preventing and treating infectious diseases. In this mini-review in *Microbial Biotechnology*, the authors argue that there is no doubt that nanotechnology holds great promise for vaccination and especially transcutaneous immunization. Key issues that will have to be solved in the future are how nano delivery devices can transport a sufficient dose of the vaccine across the SC and how this can be

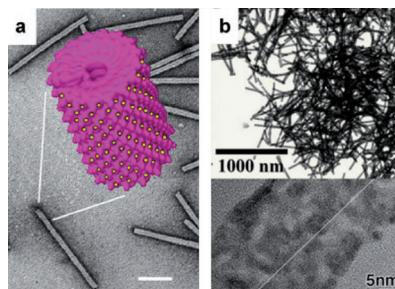
achieved without opening the skin barrier for the invasion of pathogens or harmful material. Currently, ultra-flexible liposomes are the best investigated carriers in this aspect. /feh

Hansen and Lehr, *Microb. Biotechnol.* 2012, in press.

<http://bit.ly/xflJw5F>

#### Virus-mediated nanomaterials

A virus is a nanoscaled biomolecular substance composed of genes, protecting capsid proteins, and envelopes. The nanoscale dimensions and surface functionalities of virions have been exploited to attract and assemble inorganic and organic materials to produce functional nanomaterials with large surface areas. Genetic modifications of virus capsid proteins lead to the selective deposition and controlled growth of inorganic substances producing or-



#### Christmas Prize Draw Winner



We are happy to announce that **Peter Lakatos**, Research Specialist at the University of Wisconsin, has won a Wiley book voucher worth £75! Congratulations.

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### Meetings

#### Nanomaterials for Biomedical Technologies 2012

March 6–7, 2012, Frankfurt, Germany

Nanomaterials in biomedical applications either in vitro or in vivo have raised high expectations for new and ground-breaking diagnostic and therapeutic solutions in health care and are already moving from the laboratory bench to clinical applications. This conference places an emphasis on new concepts for targeted drug, gene and protein delivery, and overcoming physiological barriers, materials for molecular imaging and diagnostics, multi-functional coatings, and bioresponsive materials.

#### PROCESSNET

EINE INITIATIVE VON DECHHEMA UND VDI-GVC

<http://www.processnet.org/en/NanoBiomed2012.html>

#### 3D Cell Culture 2012

March 14–16, 2012, Zurich, Switzerland

Advanced Model Systems, Application & Enabling Technologies.: 3D cell culture technologies and associated analytical tools are essential for basic and pharmaceutical research. Conventional 2D culture conditions do not reflect native tissue morphology and cell composition. To create tissue-specific structures and functions in vitro, cell models have to be translated into the third dimension. This 2 ½-day symposium covers the newest developments in the key areas of 3D cell culture technologies: advanced 3D cell culture models for efficacy and safety studies, enabling technologies to create and analyze biological reactions as well as their successful implementation in compound de-risking.

#### DECHHEMA

<http://events.dechema.de/3DCC.html>

See the Virtual Issue featuring *Biotechnology Journal* and *Advanced Healthcare Materials* at:

[www.materialsviews.com/biomaterials](http://www.materialsviews.com/biomaterials)

# NEW Journal

# ADVANCED HEALTHCARE MATERIALS

## Scope

**Advanced Healthcare Materials** is an international, interdisciplinary journal for peer-reviewed papers on materials science aimed at promoting human health.

**Advanced Healthcare Materials** covers all aspects of materials science in medicine and biotechnology:

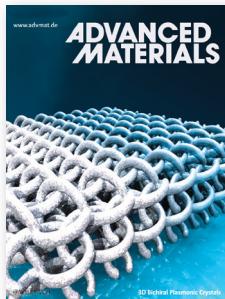
- Design
- Synthesis
- Biomaterials
- Devices for medical applications
- Physical, chemical, and biological properties
- Clinical and biotechnological applications

**Advanced Healthcare Materials** contains an attractive mix of Communications, Full Papers, and Review Articles, Progress Reports, Research News, and Essays.

All articles will be covered by major indexing and abstracting services, including Web of Science and Medline.

## Readership

Materials scientists, chemists, physicists, engineers, and medical and biotech researchers in academia as well as industry.



## Editorial Office

**Advanced Healthcare Materials** is handled by the experienced **Advanced Materials**, **Advanced Functional Materials**, and **Small** editorial teams at Wiley-VCH.



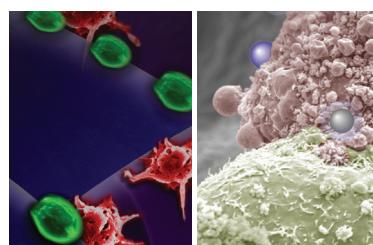
2012. Volume 1, 6 issues.  
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## Special Edition: Nanobiotechnology

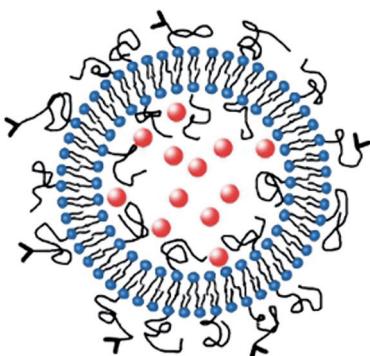
ganized virus-based hybrid materials. Due to these properties, viruses hold promise for development as platforms for the creation of hybrid materials with multiple functionalities. This article in *Biotechnology and Bioengineering* reviews the characteristics of commonly used viruses and their fabrication into virus-based hybrid materials that have been applied in engineering applications such as nanowires and catalysts. /sv

Lee et al., *Biotechnol. Bioeng.* 2012, 109, 16–30.

<http://bit.ly/AiHLf4>

### Lipids, curvature, and nano-medicine

Lipid-based nanoparticles, especially liposomes, can be successfully used as delivery vehicles for drugs and vaccines. Liposomes offer more than simple “packaging” for the passenger molecules: Tuning possibilities include targeting to a particular site (such as tumor cells) and controlled release of the drug. Among other parameters, the shape of the lipid molecules building the membrane and the curvature of the particles are important factors influencing their behavior. This review by Ole Mouritsen (Odense, Denmark) in the *European Journal of Lipid Science and Technology* deals with the emerging area of nano-medicine and explains how our understanding of the physical chemistry of lipids, membranes, and (nano)particles together with interfacial enzymology can help rationally de-



sign intelligent lipid-based drug delivery systems. /lk

Mouritsen, *Eur. J. Lipid Sci. Technol.* 2011, 113, 1174–1187.

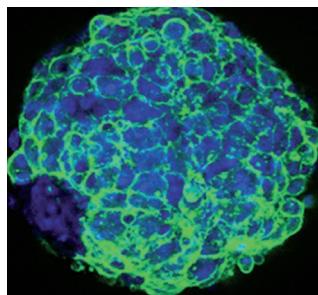
<http://bit.ly/yZiG2O>

Read more articles on lipid nano- and microparticles in EJLST:

*Delivery of radioiodinated antisense oligonucleotides in long circulating liposomes in vivo*

<http://bit.ly/wgGeCg>

### Reverse opal scaffolds for tissue engineering



Embryoid bodies, aggregates of differentiating embryonic stem cells, have been successfully used to derive cells suitable for transplant and drug screening. Formation of uniformly sized aggregates size is important for achieving high yields of a specific cell type, since embryoid body size impacts the differentiation process. It is, however, difficult to scale up the technique while maintaining control over aggregate size, limiting its use clinically and commercially. The creation of an interconnecting three dimensionally patterned scaffold could overcome this scale-up issue. The reverse opal scaffold pattern features small windows between adjacent pores, facilitating nutrient transfer and enabling uniform cell seeding. After culture is complete, degradation of the scaffold allows the embryoid bodies to be easily harvested. /fh

Zhang and Zia, *Adv. Funct. Mater.* 2012, 22, 121–129.

<http://bit.ly/xnxw4h>

## Getting published

### Writing a good review: An intellectual challenge and well worth it...



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I was once told “writing a review is relatively straightforward way into the literature, so it’s often the kind of paper on which PhD students ‘cut their teeth’”. Hmm... I thought. And the more I see of reviews (as Editor of a reviews and features journal), the more I disagree that a *good* review is straightforward. Technically it might be straightforward for someone with a once-in-a-lifetime overview of the current literature – such as a PhD student just about to write-up her/his thesis: technically in the sense of cataloguing the relevant literature. But is that a review? Maybe, but it would be a bit boring by most standards. “Re-view” literally means “taking another look”. When we look at an object, our brain identifies different features of the object, e.g. shape, color, movement (information) to produce a meaning of the whole: how exactly that is done is still a mystery. It represents the famous “binding problem” of neuroscience and philosophy. Integrating information to produce meaning is clearly not a trivial function; integrating primary research findings to produce a “bigger” picture is also not a simple task. But that is what, in my opinion, distinguishes a really interesting and useful review from a trudging encyclopedic catalogue. Many people in science are in it for the challenge of understanding new things; a good review, as I define it above, can be a masterpiece of thinking and writing that will be read (and cited) by a disproportionately large readership compared with the primary literature it contains. For a PhD student to write a review is certainly a good thing, but not because it’s a straightforward way into the literature – rather because of a more noble aim: that of contributing novel, synthetic, insights to one’s field. As I recently opined in an editorial [1], integrating research findings is just as much a scientific talent as producing them. /am

[1] Moore, A., *Have we produced enough results yet, sir?* *BioEssays* 2012, 34, 163.

<http://dx.doi.org/10.1002/bies.201290005>

Andrew Moore is Editor-in-Chief of the review-and-discussion journal *BioEssays*.

**BioEssays**

[www.bioessays-journal.com](http://www.bioessays-journal.com)

# Biotechnology Journal – Call for papers

## Tissue Engineering Special issue



**3<sup>rd</sup> International Conference "Strategies in Tissue Engineering" – May 23–25, 2012, Würzburg, Germany**

Organized by the Würzburg Initiative Tissue Engineering (WITE e.V.), this conference will bring together researchers from various fields of Tissue Engineering and Regenerative Medicine including the translational aspects of advanced therapies.

*Biotechnology Journal* is partnering with the organizers to publish a special issue on "Strategies in Tissue Engineering" – register for the conference (early bird: March 10; regular: May 22) and submit your full article to the journal by July 23, 2012. Guest editors: Prof. Heike Walles and Prof. Katja Schenkel-Layland.

<http://www.wite.org/conference2012/>

## Methods and Advances 2013 Special issue



*Biotechnology Journal* continues its tradition of publishing a *Methods and Advances* special issue in January, 2013. Articles in this annual special issue are highly downloaded and freely available to all.

Please submit your methods paper (Research Article, Technical Report or Rapid Communication) before May 2, 2012 – a fast process of peer review by our board of international experts will provide you with timely feedback.

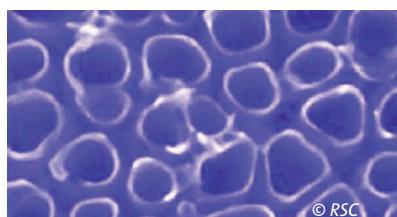
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Note that with our Accepted Articles function, all accepted primary research articles are available online within days of acceptance.

<http://www.biotechnology-journal.com>  
<http://mc.manuscriptcentral.com/btj>

## Synergy between growth factors and nanotopography

Nanoscale surface features combine with growth factors to cue specific cell differentiation fates. In an investigation of mesenchymal stem cells, reported in *Small*, response to titanium dioxide nanotubes, differentiation outcome was found to be sensitive to the nanotube feature. Changing the diameter of the nanotubes allowed differentiation to be guided preferentially towards



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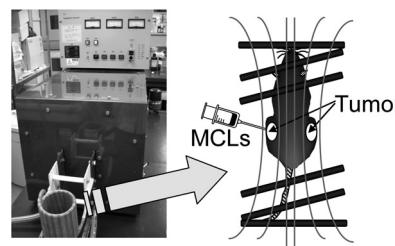
bone or towards cartilage fate. By combining the nanotube pattern with a coating of the growth factor BMP-2, efficient formation of bone and cartilage was achieved using a fraction of the amount of growth factor usually required. Integrating the growth factor-plus-nanotopography combination into dental and orthopaedic implant surfaces may result in cheaper and more effective implants. /fh

Park et al., *Small* 2012, 8, 98–107.

<http://bit.ly/wBZeoI>

## Cancer hyperthermia using magnetic nanoparticles

Temperatures above 43°C cause necrosis of cancer cells, because they are more heat sensitive than normal tissue. Thus, hyperthermia is a promising approach for cancer therapy, potentially causing fewer side effects than chemo- or radiotherapy. Magnetic-nanoparticles are targeted to the tumor tissue and heated up locally by application of an external alternating magnetic field. In addition to the expected tumor cell death, hyperthermia treatment also induces tumor-specific immune respons-



es as a result of heat-shock protein expression. These results suggest that hyperthermia is able to kill not only local tumors, but also metastasis. Clinical trials are currently ongoing with promising results. This review article in *Biotechnology Journal* by Takeshi Kobayashi (Chubu University, Japan) describes recent advances in magnetite nanoparticle-mediated hyperthermia. /ug

Kobayashi, *Biotechnol. J.* 2011, 6, 1342–1347.

<http://bit.ly/zDkloN>

## Early warning system for catheter contamination

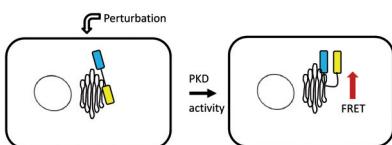


Serious clinical complications can result from bacterial infection and blockage of urinary catheters, particularly in elderly and disabled patients that require long-term catheter use. A new silicone based sensor system described in *Journal of Biomedical Materials Research, Part B* is able to detect the presence of a bacterial strain that commonly causes catheter encrustation and blockage. By incorporating the pH indicator bromothymol blue into the sensor material, bacterial contamination was signaled by a change in sensor color from yellow to dark blue. The sensor system allowed encrustation and blockage of a catheter to be predicted up to 24 h in advance in a laboratory catheter model. /fh

Malic et al., *J. Biomed. Mater. Res. Part B* 2012, 100B, 133–137.

<http://dx.doi.org/10.1002/jbm.b.31930>

### PKD activity reporter at membranes



Protein kinase D (PKD) has functions in the regulation of constitutive protein transport from the trans-Golgi-network to the basolateral plasma membrane. Detection of PKD-specific activity is usually performed with a phospho-specific antibody, which is not possible in living cells. This article in *Biotechnology Journal* shows the development of G-PKDrep-live, a FRET-based genetically encoded fluorescent reporter, which is monitoring endogenous PKD activity at the trans-Golgi-network in live cells. Phosphorylation of G-PKDrep-live, which is constitutively expressed in mammalian cells results in changes of fluorescence resonance energy transfer (FRET), and allows for indirect imaging of PKD activity. This newly developed reporter G-PKDrep-live is a suitable tool to visualize dynamic changes in PKD activity in living cells and will be a useful tool to identify signaling pathways that activate PKD. /ug

Eisler et al., *Biotechnol. J.* 2012, 7, 148–154.

<http://dx.doi.org/10.1002/biot.201100273>

Read the accompanying *Commentary* by N. Gautam:

<http://dx.doi.org/10.1002/biot.201100424>

### Scientist Profile

#### Prof. Daocheng Wu: NCAHbs as a nanosized oxygen carrier



The 17<sup>th</sup> International Biophysics Congress (IUPAB) was successfully held in Beijing, China, Oct 30–Nov 3, 2011 (see Jan 2012 issue of

*BiotecVisions*). Dr. Jing Zhu, Editorial Assistant of *Biotechnology Journal* had the pleasure of talking to Prof. Daocheng Wu, who is the Vice Dean of School of Life Science and Technology, Xi'an Jiaotong University, China. Currently Prof. Wu's research is focused on the areas of biomaterials, bionanotechnology, drug delivery system, nanoparticles for diagnosis and therapy, etc. To overcome the various challenges associated with blood transfusions, such as limited number of donors and the risk of infection, Prof. Wu and Prof. Lixian Xu's laboratory developed a comprehensive strategy for the preparation of nanosized cationic amylose-encapsulated hemoglobins (NCAHbs); their study indicated that NCAHbs harbored tremendous potential in biomedical and clinical applications. This work was published in *Biomaterials* in 2011, and was highlighted by a number of Chinese social media. "We still have a long way to go", said Prof. Wu, "We need to dig deeper based on what we have found. We are expecting international collaborators working on different subject areas; we would obtain great success based on their profound theoretical research. Collaboration is a must under the present circumstance if we want to achieve deep scientific insight". /jz

<http://onlinelibrary.wiley.com/doi/10.1002/biot.201100482/abstract>

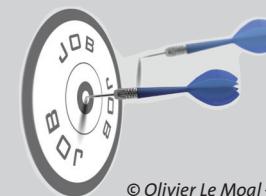
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### Special issue Biosensors

This issue of *Engineering in Life Sciences* on Biosensors, edited by Dieter Beckmann, Institut für Bioprozess- und Analysenmesstechnik e.V., Heilbad Heiligenstadt, Germany, addresses several current challenges in life science engineering for biosensor development and applications, the opportunities of microfluidic systems as well as solutions for

### BiotecCareers



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#### PhD and then? Interview with a team leader in Pharma

After her PhD in epigenetics, **Anna Jones** joined a large pharmaceutical company.

**Q:** Please tell us about what you do.

**A:** I'm a research scientist in oncology and in vitro pharmacology.

**Q:** What do you enjoy most about the job?

**A:** Working in teams and goal-oriented (with the hope to make a difference for patients), social networking, specific trainings to develop and pursue my career.

**Q:** Are there any aspects that could be different?

**A:** Pressure to achieve milestones. We need to understand the biology behind a specific target in detail, which is very challenging under time pressure. FTO (freedom to operate) / IP (intellectual properties) issues also contribute to the challenges. Also, patents that preclude us from working on a very interesting cancer target can be frustrating.

**Q:** Why/how did you decide to move from academia to this sector/job?

**A:** I was tired of writing grant applications and papers under pressure (publish or perish).

**Q:** What aspects of your PhD/postdoc experience have been most useful in getting the job, and doing the job?

**A:** Deep knowledge and expertise in my field, good language skills (English)

**Q:** What is your one tip for PhD students or postdocs who might be considering a move to pharma?

**A:** Be aware that a contract can be limited to one year or the duration a colleague is on parental leave. Nevertheless, it gives you the chance to network and apply to an open position elsewhere in the company.

Interview by **Barbara Janssens**, PhD Career Advisor, DKFZ, Heidelberg /bj

[www.facebook.com/phdcareers](http://www.facebook.com/phdcareers)  
[www.dkfz.de/phd/Careers.html](http://www.dkfz.de/phd/Careers.html)

## Current Protocols

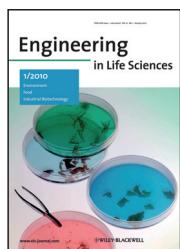


### Liquid chromatography of proteins

Reversed-phase High Performance Liquid Chromatography (RP-HPLC) is one of most important techniques for protein separations and the method of choice for peptide separation. RP-HPLC has been applied on the nano, micro, and analytical scale, and has also been scaled up for preparative purifications, to large industrial scale. Because of its compatibility with mass spectrometry, RP-HPLC is an indispensable tool in proteomic research. /bm

Josic and Kovac, *Curr. Protoc. Protein Sci.* 61, 8.7.1–8.7.22.

<http://www.currentprotocols.com/protocol/ps0807>



<http://onlinelibrary.wiley.com/doi/10.1002/elsc.v11.6/issuetoc>  
[www.els-journal.com](http://www.els-journal.com)

### Peptide extraction from FFPE

Identifying protein biomarkers from diseased and normal tissue is an important strategy for both improving the understanding of disease pathophysiology, as well as developing potential new diagnostic indicators of disease or the response to treatment. Tryptic peptides can be extracted from formalin-fixed, paraffin-embedded (FFPE) tissues for analysis using nano-reverse-phase liquid chromatography/tandem mass spectrometry (nRPLC-MS/MS). /bm

Heaton and Master, *Curr. Protoc. Protein Sci.* 65, 23.5.1–23.5.19.

<http://www.currentprotocols.com/protocol/ps2305>

## Advertorial

### Genomics Research 2012



Genomics Research 2012 aims to provide a technical programme that encompasses all of the cutting edge topics within Genomics Research, with a particular focus on its application in the development of therapeutics and diagnostics. Network with over 400 of your peers and 50 exhibiting companies to create partnerships and collaborations to advance your research. It will encompass our successful RNAi & miRNA, Advances in qPCR, Epigenetics, Next-Gen Sequencing conference streams, as well as Genomic Biomarkers.

This year's event will be held in Boston and registered delegates will have access to all five meetings ensuring a very cost-effective trip. Visit the website for agenda and registration information.

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<http://selectbiosciences.com/conferences/index.aspx?conf=GR2012>

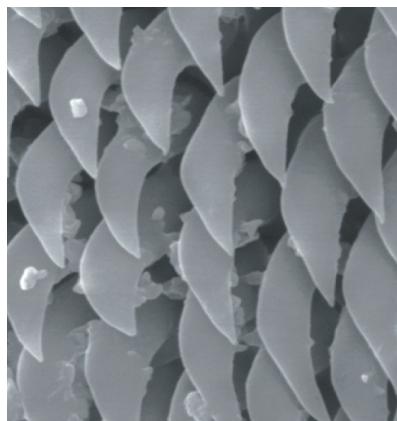
## Materials Views



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### Beetle-mimetic velcro?



Korean scientists present a new interlocking material based on the mechanism beetles use to lock away their wings.

<http://bit.ly/zVRLPH>

### Stain your brain: Nanoparticles enable brain surgery

Researchers from the University of Michigan have developed a nanoparticle-based system for staining brain tumours, improving on previous fluorescence and MRI-based methods.

<http://bit.ly/xGogMh>

### Gold-nanoparticle-based assay for understanding Alzheimer's disease

A highly sensitive assay has been developed, and applied to monitor progression and treatment of Alzheimer's disease in model mice.

<http://bit.ly/wIFuhK>

## New Journal

### Advanced Healthcare Materials



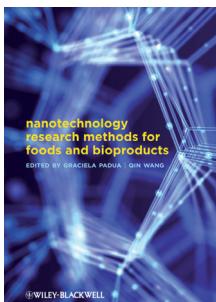
*Advanced Healthcare Materials*, an interdisciplinary forum for peer-reviewed papers on materials science aimed at promoting human health, will cover all aspects of materials science in medicine and biotechnology and will feature a full range of article types: Communications, Full Papers, Review Articles, Progress Reports, Research News, and Essays. This new journal will bring you the latest developments in cutting-edge research areas such as drug-delivery systems, cancer therapy, tissue engineering, biosensors and diagnostic tools, personalized medicine, bioelectronics, implantable devices, and much more. The first issue of *Advanced Healthcare Materials* was published in January 2012 and the journal is currently available for free until the end of 2013!

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## Special Edition: Nanobiotechnology

### Books



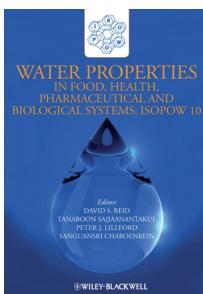
#### Nanotechnology Research Methods for Food and Bioproducts

Graciela Wild Padua and Qin Wang  
ISBN: 978-0-8138-1731-6

Food nanotechnology is an expanding field.

This expansion is based on the advent of new technologies for nanostructure characterization, visualization, and construction. *Nanotechnology Research Methods for Food and Bioproducts* introduces the reader to a selection of the most widely used techniques in food and bioproduct nanotechnology. This book focuses on state-of-the-art equipment and contains a description of the essential tool kit of a nanotechnologist. /ag

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#### Water Properties in Food, Health, Pharmaceutical and Biological Systems: ISOPOW 10

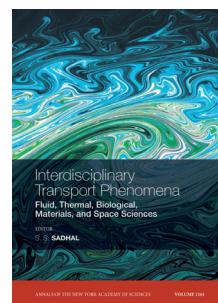
David S. Reid  
(Editor), Tanaboon Sajjaanantakul  
(Editor), Peter J. Lillford  
(Editor), Sanguansri Charoenrein (Editor)

ISBN: 978-0-8138-1273-1

This book focuses on the comprehension of the properties of water in foods, enriched by the approaches from polymer and materials sciences, and by the advances of analytical techniques. The International Symposium on the Properties of Water (ISOPOW) promotes the exchange of knowledge between scientists involved in the study of food materials and scientists interested in water from a more basic point of view and the dialogue between academic and industrial scientists/technologists. This com-

prehensive book covers the topics presented at the 10th ISOPOW held in Bangkok, Thailand in 2007, including water dynamics in various systems, the role of water in functional food and nano-structured biomaterials. /ag

<http://www.wiley.com/buy/9780813812731>



#### Interdisciplinary Transport Phenomena

S. S. Sadhal  
ISBN: 978-1-57331-712-2

This volume brings together a collection of articles that crosses traditional boundaries of scientific expertise under the common theme of transport phenomena.

Transport phenomena in relation to fluid, thermal, biological, materials, and space sciences are investigated. Chapters include contributions in the following areas: (1) biotransport phenomena and medical applications, including bio-transport phenomena in physiology and medicine, targeted drug delivery, protein crystal growth, and transport in bioporous media; (2) transport processes in materials technology, with chapters on containerless processing, levitation studies, electrostatic and electromagnetic phenomena, diffusion processes, and inorganic crystal growth; (3) space exploration technologies, for example, bio-response in the space environment, combustion and space power systems, boiling phenomena in space, thermal management in space, and water reclamation technologies; (4) interfacial phenomena and phase transitions, including drops, bubbles, particles, phase-change phenomena, surfactants, and complex fluids; and (5) transport phenomena and properties of nanoparticles and aerosols. /ag

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- Toward toxicity testing of nanomaterials in the 21<sup>st</sup> century: A paradigm for moving forward

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#### Overview

- Hydrogels and microtechnologies for engineering the cellular microenvironment

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#### Advanced Review

- Noble metal nanoparticles in DNA detection and delivery

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#### Focus Article

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#### Editorial Commentary

- The need to pursue and publish clinical trials in nanomedicine

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<http://wires.wiley.com/WileyCDA/WiresCollection/id-15.html>

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<http://wires.wiley.com/WileyCDA/WiresCollection/id-20.html>

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