

# Sustainable Biomimetic Nanotechnology: Inspiration from Nature for Disruptive Micro- and Nanosystems

I.C. Gebeshuber<sup>1,2,\*</sup>

<sup>1</sup>*Institute of Applied Physics, Vienna University of Technology, Wien, 1040, Austria*

<sup>2</sup>*Aramis Technologies Sdn. Bhd., Bandar Kinrara, 47180 Puchong, Selangor, Malaysia*

*\*Corresponding author: Ille C. Gebeshuber (gebeshuber@iap.tuwien.ac.at)*

## **Abstract**

Microsystems and nanotechnologies are booming technological fields with important implications on human life and the biosphere, on all scales. The micro- and nanoscale is an important realm for the language of life.

Living nature excels in sustainable ways to accumulate materials, manufacture functional structures via ambient processes and use and dispose of their products in ways that make them available as resources such as scaffolds, food or fertilizer for further organisms.

The presentation will address Nature's nanotechnology, including mining with plants, nanoparticle production in organisms, biomineralization of microstructures comprising more than 70 different minerals, all produced at ambient conditions, and counterintuitive ways of plants resulting in functions that are of high importance in technical devices.

Based on selected examples of already successfully transferred interdisciplinary knowledge from our greatest teacher to engineering the talk will reveal the underlying principles and provide food for thought for the development of a comprehensive nanotechnology for the well-being of all.

## **Recommended Reading:**

### **Materials**

Karman S.B., Diah S.Z.M. and Gebeshuber I.C. (2015) "Raw materials synthesis from heavy metal industry effluents with bioremediation and phytomining: A biomimetic resource management approach", *Advances in Materials Science and Engineering Volume 2015*, Article ID 185071, 21 pages (Open Access), doi:10.1155/2015/185071.

### **Structures**

Diah S.Z.M., Karman S.B. and Gebeshuber I.C. (2014) "Nanostructural colouration in Malaysian plants: Lessons for biomimetics and biomaterials", *Journal of Nanomaterials Volume 2014*, Article ID 878409, 15 pages (Open Access), doi:10.1155/2014/878409.

### **Processes**

Gebeshuber I.C. (2015) "Biomineralization in marine organisms: status, challenges and prospects for biotechnology". Chapter 58, Part XI (Marine biotechnological products in industrial application), *Springer Handbook of Marine Biotechnology*, Se-Kwon Kim (Ed.), Springer, 1800 p., ISBN 978-3-642-53970-1, ch. 58, 1279-1300.

**Keywords:** *nanotechnology, microsystems, disruptive*