Biomimetic materials solutions
Throughout history materials scientists have been intrigued by the beauty and exceptional performance of natural materials. This applies to common nanocomposites such as seashells, bones, nacre and enamel, as well as to functional surfaces like gecko feet and lotus leaves. VTT’s approach towards biomimetic materials refers to the utilization of natural materials design, especially for the development of multifunctional and hybrid materials.

VTT employs its interdisciplinary, cross-organizational technology platforms to utilize biomimetic materials concepts as an enabling tool for advanced materials solutions. This is achieved by combining various in-house expertise and methodologies from physics, chemistry, biology, and engineering. State-of-the-art equipment supports these developments.

Biomimetic Porous Structures
Nature employs porosity not only for light-weight materials, but also for functional hybrid structures. In a similar fashion, high resolution Direct Write Paste (DWP) printing technology enables the printing of biomimetic and biocompatible scaffolds for tissue engineering and implants. Other application areas are biomimetic membranes and barriers, e.g. for packaging applications.
Biomimetic Lubrication

Lubrication is a key factor for many materials applications, improving performance, energy and materials savings. Therefore VTT has developed a biomimetic approach towards lubrication, as biology provides a large number of extremely efficient lubrication systems, such as mammalian joints. Following a biomolecular approach based on engineered proteins enables environmentally friendly, water-based lubrication systems.

Biomimetic Hybrid Materials

Structural design of materials takes a leading role in the development of consumer goods and the manufacturing industry. As many of the extraordinary properties of natural materials originate from composite structures, biomimetic hybrid materials are another focus of VTT’s biomimetics materials approach. The specific control of interfacial interactions by engineered proteins enables extraordinary performances, such as light-weight design in combination with high strength and toughness.

Benefits of Biomimetic Materials

• Materials and energy savings by high performance and light-weight construction materials
• Improved cost efficiency and materials safety by water-based technologies
• Bio-functional and biocompatible materials for biomedical applications
• Biomimetic coatings, barriers and membranes
• Self-healing materials
• Customized biomimetic concepts for specific application needs

www.vtt.fi/functionalmaterials

Additional information

Asko Ojala
Key Account Manager
Tel +358 20 722 3024
asko.ojala@vtt.fi

Hans-Peter Hentze
Principal Scientist, Research Coordinator
Tel. +358 20 722 7532
hans-peter.hentze@vtt.fi

Markus Linder
Research Professor for Functional materials
Tel. +358 20 722 5136
markus.linder@vtt.fi

VTT TECHNICAL RESEARCH CENTRE OF FINLAND

Technology and market foresight • Strategic research • Product and service development • IPR and licensing • Assessments, testing, inspection, certification • Technology and innovation management • Technology partnership