

Dissertation press release

7.6.2018

Surface engineering – a versatile tool for the fabrication of functional nanomaterials and tough nanocomposites

Title of the dissertation	Surface Engineering of Nanomaterials for Biomimetic and Hybrid Applications
Contents of the dissertation	<p>Surface engineering opens great opportunities both in the field of nanocomposites through enhancement of compatibility of their components and in the field of functional nanomaterials by development of various topographies and obtaining of new physical and chemical properties of nanoobjects.</p> <p>Cellulose nanocrystals (CNCs) and cellulose nanofibrils (CNFs) are important classes of nanomaterials because of their abundance, eco-friendliness and excellent mechanical properties. Therefore, most attention in this thesis was paid to the grafting of well-defined polymer brushes from the surfaces of CNCs and CNFs and studying both opportunities and limitations of this approach. Surface engineering based on using of polymer brushes allows obtaining of 3D topographies or synthesis of uniform inorganic shell on the surfaces of CNCs, which are of interest for the variety of applications.</p> <p>In recent decades, many attempts have been made to create nacre-mimetic composite materials due to exceptional mechanical properties of nacre. However, nacre-mimetic nanocomposites were limited to thin films, while study of fracture mechanics of materials requires bulk samples. This thesis filled this gap and considered preparation and characterization of bulk nacre-mimetic nanocomposites.</p>
Field of the dissertation	Engineering Physics
Doctoral candidate	Maria Morits, M. Sc
Time of the defence	21.6.2018 at 12 noon
Place of the defence	Aalto University School of Science, lecture hall TU1, Maarintie 8, Espoo
Opponent	Associate Professor Emily Cranston, McMaster University, Canada
Custos	Professor Olli Ikkala, Aalto University School of Science, Department of Applied Physics
Doctoral candidate's contact information	Maria Morits, Department of Applied Physics, +358458071086, maria.morits@aalto.fi