

## Course Package

# Materials Science & Technology - 2B

Name module	Materials Science & Technology - 2B
Course Code	202000748
Educational programme	BSc Chemical Science and Engineering
Period	Second block of the second semester (block 2B)
Study load	15 ECTS
Coordinator	Jéré van Lente

Materials Science & Technology			
block 1A	block 1B	block 2A	block 2B
			<b>C &amp; T of Inorganic Materials 202000749 (4 EC)</b>
			<b>C &amp; T of Organic Materials 202000750 (4 EC)</b>
			<b>Advanced Materials Science &amp; Project 202000751 Project Materials S&amp;T (7 EC)</b>

Required preliminary knowledge: Basic Organic; Inorganic, and Polymer Chemistry; Basic Physics; Calculus, and Basic lab skills; Materials – or similar course(s) to be admissible; Basic Material Science; Basic Quantum; Mathematics.

*Note: this module has limited capacity. In case of much interest, students will be selected.*

**Please note, you need to register for the courses for 2A in Osiris 2 weeks before the start of the block!**

### **202000749 - Chem. & Technol. of Inorganic Materials**

The course Chemistry and Technology of Inorganic Materials deals with the relation between material synthesis and structure/composition. It will focus on the effect of specific synthesis techniques on the achieved microstructure, which determines the material properties, and therefore, can determine specific functionalities in materials.

The course consists of lectures on the relation between microstructure and applied synthesis techniques (thin film, thick film, bulk) of inorganic materials. Various physical vapour deposition techniques as well as chemical vapour techniques for films will be discussed as well as sol gel and sintering techniques for obtaining bulk materials. The effect of strain in materials, caused by epitaxial growth, will also be studied.

*The modules are tentative and subject to change. Please check [the website](#) regularly.*

### **202000750 - Chem. & Technol. of Organic Materials**

The CTOM course provides students with knowledge in the areas of polymer synthesis, characterization, properties in the melt and in solution, and of state of the art polymerization (including living ionic and controlled radical) processes. Relations between the structure of polymers and their properties and applications are discussed.

The CTOM course consists of two parts: Polymer Chemistry and Polymer Physics. In the Polymer Chemistry part, basic properties of polymers, polymer synthesis techniques, and polymerization mechanisms and kinetics are discussed. In the Polymer Physics part, structure-property relations, amorphous and semicrystalline polymers, mechanical properties, viscoelasticity, chain dimensions, polymer networks and properties in solution will be dealt with.

### **202000751 - Advanced Materials Science & Project**

The course Advanced Materials Science & Project deals with the relation between material properties and how these relate to the atoms and atomic structure/composition of the material. The course provides knowledge and insight into the functional properties of various material classes; and it provides understanding of the relations between microstructure and properties of materials.

The course consists of a series of two combined lectures after each other (colstructions). The first is a lecture on the structure and functional properties of several material classes (polymer, ceramic and metal). In the second part the students make exercises related to the topic of the lecture under supervision of the lecturer. Each set of combined lectures deals with a different physical phenomenon, which can be material properties such as electrical conductivity or magnetism or physical processes such as diffusion.