



PHYSICAL CHEMISTRY III, LABORATORY COURSE

Enrollment year	2016/2017
Academic year	2016/2017
Regulations	DM270
Academic discipline	CHIM/02 (PHYSICAL CHEMISTRY)
Department	DEPARTMENT OF CHEMISTRY
Course	CHEMISTRY
Curriculum	Chimica dei Materiali
Year of study	1°
Period	2nd semester (01/03/2017 - 20/06/2017)
ECTS	9
Lesson hours	96 lesson hours
Language	ITALIAN
Activity type	ORAL TEST
Teacher	GHIGNA PAOLO (titolare) - 3 ECTS BINI MARCELLA - 3 ECTS MUSTARELLI PIERCARLO - 3 ECTS
Prerequisites	Physical chemistry notions
Learning outcomes	Aim of the course is to provide students with the appropriate practical and conceptual tools for developing advanced techniques for the synthesis and structural characterization of solids. At the end of the course, the student should be able to plan the preparation of a material of interest and to characterize it from the point of view of long-and short-range order.
Course contents	The course is divided into three parts: The first part deals with the thermodynamic and kinetic aspects involved in phase transitions, with particular emphasis to solid state reactivity. Laboratory experiments on the synthesis of materials of technological interest complete this part of the course.

	In the second part the structural refinement methods on powder X-ray diffraction data will be treated. In particular, the Rietveld method useful to determine the main structural and microstructural parameters as well as to quantify the crystalline and amorphous components will be described. The corresponding laboratory will be devoted to practical exercises dealing with structural issues of material science In the third part, the principles of NMR spectroscopy in the solid state will be introduced. In particular, the energy terms determining the shape and the size of the spectrum, and the main methods to obtain high-resolution information in the solid state will be discussed. The laboratory will be completed by practical exercises on problems of materials science, where students will use state-of-the-art instrumentation.
Teaching methods	For all the three modules, the topics treated during the lessons, will be explained also during the laboratory activities
Reccomended or required readings	Educational material given by the teachers
Assessment methods	Oral examination
Further information	
Sustainable development goals - Agenda 2030	\$lbl_legenda_sviluppo_sostenibile