

Chemistry

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The policy followed at the Chemistry Department was the reinforcement of its competence skills on: the synthesis and characterization of inactive and radioactive compounds with relevance in Health, Materials and Nuclear Sciences and Catalysis; and the implementation and use of nuclear-based and related analytical techniques to Environmental and Earth Sciences and Cultural Heritage.

Activities are organized in five research teams:

Solid State – the group centres its research activity in complementary areas of solid state science focused on new materials with unconventional electrical and magnetic properties. It combines a high expertise on preparative chemistry of molecule based conducting and magnetic materials and of intermetallic compounds with a wide range of specialized solid state techniques. The expertise in high temperature preparation techniques allowed an industrial contract to be carried out with nuclear fuel industry.

Inorganic and Organometallic Chemistry – the activities of the group comprise the synthesis, characterization and chemical reactivity studies of inorganic, organometallic and intermetallic compounds of actinides and lanthanides aiming at understanding the influence of the electronic structure of these elements in the chemical properties of their compounds. Studies using the new ESI/QITMS facility were initiated and several ionic species generated from thorium, uranyl and lanthanide nitrates were characterized in the gas phase.

Inorganic and Radiopharmaceutical Chemistry – The group is involved in basic/applied-oriented research and technology transfer to find radioactive probes for molecular imaging and/or targeted radiotherapy. Research is based on innovative organic and coordination chemistry, bioconjugation, radiochemistry, radiopharmacy and cellular biology. Some of the major achievements were the implementation of a new technique - Western Blot and the selection of the ISATechII complex by a

pharmaceutical company to enter into clinical evaluation as a myocardial imaging probe.

Environment and Analytical Chemistry – the group is committed to the comprehension of the biogeochemical cycles of chemical elements and light isotopes in the Environment. Nuclear-related analytical techniques, mass spectrometry for light isotopes, tritium and radiocarbon dating are applied in: Environmental Geochemistry, Isotope Hydrology, Oceanography, and Archaeometry. Studies on coastal upwelling, coastal palaeoenvironmental evolution, water resources, radiocarbon dating and archaeometallurgy were pursued and strengthened.

Cultural Heritage and Sciences – research team is especially dedicated to the study of Portuguese cultural assets and corresponding environment contexts, through the application of nuclear analytical methods and absolute dating. Geochemistry, mineralogy and chronology are the main research domains, applied to archaeometry, environmental geology and palaeoenvironmental reconstruction. Luminescence laboratory activities have progressed to new research projects in archaeometry and geology.

During 2007 some laboratories were rebuilt and new facilities/equipments installed. Under the National Scientific Infrastructure Programme, an OSL dating reader system with a dual laser single grain OSL attachment, a gamma Spectrometer with automatic sample changer, a SQUID magnetometer and an ESI/QITMS (part of the National Mass Spectrometry Network) were installed and put in operation. Besides, a HPLC coupled with an ICP/MS were purchased.

Chemistry researchers maintained its recognized tradition on high level education and training by student's supervision (MSc, PhD and Post-doc) and participation in advanced training activities.

National and international projects financed by the FCT and EC most with the scientific coordination of the Department are in progress. Further funds were obtained by Protocols, Contracts and Services with different Institutions and Industries.

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