Experimental Sciences

CATALOGUE

Universidad de Alcalá

Comunidad de Madrid

Dirección General de Investigación e Innovación Tecnológica

CONSEJERÍA DE CIENCIA, UNIVERSIDADES E INNOVACIÓN

Universidad de Alcalá

Experimental Sciences

- WATER, CLIMATE AND ENVIRONMENT
- WELFARE ON ANIMAL RESEARCH
- SOIL BIOLOGY AND SUBTERRANEAN ECOSYSTEMS
- AGROFORESTRY BIOTECHNOLOGY
- CHEMICAL AND FORENSIC SCIENCES
- CATALYSIS DENDRIMERS AND NANOCHEMISTRY
- FORENSIC ENTOMOLOGY
- MOLECULAR GENETICS OF SEED DEVELOPMENT
- DINOFLAGELLATES AND PLANTS GENETICS AND GENOMICS
- BIOLOGICAL INVASIONS
- MYCORRHIZAL FUNGI, TAXONOMY, IN VITRO CULTURE AND FUNGAL FRUCTIFICATION
- MINIATURIZATION AND ANALYTICAL NANOTECHNOLOGY
- PALAEOENVIRONMENTS OF THE QUATERNARY AND ITS CLIMATIC IMPLICATIONS
- IBERIAN PALEONTOLOGY
- POLYMERS AND SUPRAMOLECULES
- SUSTANAIBLE CATALYTIC PROCESSES WITH ORGANOMETALLIC COMPOUNDS
- REACTIVITY AND MOLECULAR STRUCTURE
- PLANT RESPONSES TO STRESS CONDITIONS
- (MICRO)-SEPARATION TECHNIQUES

Universidad de Alcalá

CATALYSIS, DENDRIMERS AND NANOCHEMISTRY

Code
656

Dendrocat

RESEARCH AREA

Experimental Sciences

COORDINATOR

Ernesto de Jesús Alcañiz
Juan C. Flores Serrano

KEY WORDS

Organometallic chemistry, catalysis, Green chemistry, Sustainable chemistry, Nanochemistry

AIM

- Chemical industry
- Pharmaceutical industry

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DENDROCAT
CATALYSIS, DENDRIMERS, AND NANOCHEMISTRY

ABOUT US

The aim of our research is to improve chemical sustainability by developing new molecular, supported, or nano-catalysts. We apply fundamental concepts of organometallic chemistry and homogeneous catalysis in areas such as aqueous-phase organic synthesis, recovery of catalysts or hydrogen storage

RESEARCH LINES

- Synthesis and reactivity in aqueous phase of hydrosoluble organometallic complexes (especially with N-heterocyclic carbene ligands)
- Reactivity and mechanistic studies aimed at understanding the role of water in processes involving organometallic complexes
- Development of catalytic processes for the formation of C-C and C-E bonds in aqueous media and biphasic recovery of catalysts
- Recovery of catalysts supported on nanomaterials (dendrimers, nanoparticles, carbon nanotubes, etc.)
- Synthesis and characterization of water-soluble metal nanoparticles stabilized by NHC ligands
- Preparation, properties and reactivity of open-shell palladium complexes
- Catalysts for the chemical storage of hydrogen

OFFERED SERVICES

- Technical services of synthesis and characterization of inorganic compounds
- Advice in the areas of expertise of the research group

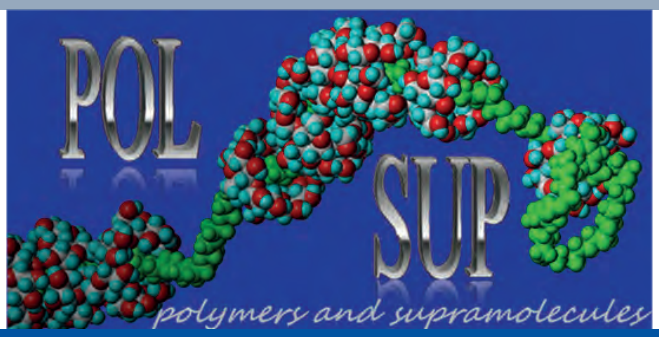
MARKETABLE RESULTS

Universidad de Alcalá

POLYMERS AND SUPRAMOLECULES

Code
718

POLSUP



ÁREAS DE APLICACIÓN

Experimental Sciences

COORDINATOR

Francisco Mendicuti Madrid

KEYWORDS

Polymers, Colloids, Tensioactives, Supramolecules, Cyclodextrins, Photophysics, Rheology, Light Scattering, GPC, Molecular Modelling

AIM

- Research groups from the UAH and other universities
- Research centers and companies in chemical and pharmaceutical sectors

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ABOUT US

Theoretical-experimental study of polymers and supramolecular structures (macrocycles, micelles, vesicles/liposomes, liquid crystals, gels, etc.) by using different techniques and physicochemical methods.

RESEARCH LINES

- Synthesis, characterization and the study of conformational properties of polymers (polyesters, polyphosphazenes, polyelectrolytes, photoconductive polymers, etc.)
- Micro- and nano-transporters of drugs and genic material (polymers, macrocycles, micelles, vesicles/liposomes, liquid crystals, microgels, etc.)
- Modulation of non-linear optical properties of molecules using the supramolecular chemistry
- Phasic and rheological characterization of micelles, vesicles/liposomes, crystals liquids, microgels, etc.
- Polymeric gels and microgels: design, characterization and applications mainly in the field of biotechnology
- Development of colored surfaces based on synthetic melanins
- Thermodynamics of the transport properties in biological systems

OFFERED SERVICES

- Characterization of a wide variety of systems using techniques in which group members are experts (GPC, DLS, Rheology, UV-Vis, steady-state and time resolved Fluorescence and circular dichroism spectroscopies, molecular modelling, etc.)

MARKETABLE RESULTS

Universidad de Alcalá

WATER, CLIMATE AND ENVIRONMENT

Code
725

ACMA

RESEARCH AREA

Experimental Sciences

COORDINATOR

Silvia Martínez Pérez
Antonio Sastre Merlín

KEY WORDS

Hydrology and hydrogeology, Water management, Modelling, Freshwater ecosystems, Climate, Climate change, Geochemistry, Unsaturated zone, Permafrost

AIM

- Engineer and environmental management companies
- Public administrations with competences on water management

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ACMA
Agua, Clima y Medio Ambiente

ABOUT US

Research about hydrological resources and aquatic ecosystems, with a multi-disciplinary and holistic perspective, with particular emphasis on the effects of climate on these resources. We also assess the environmental impacts of a variety of activities related to water management.

RESEARCH LINES

- Surface water – groundwater relationships
- Hydrological, hydrogeological and water quality modelling at a catchment scale
- Simulation of global change scenarios and their impacts on water resources
- Water quality assessment of freshwater ecosystems
- Unsaturated zone hydrology
- Environmental geochemistry
- Water erosion in Mediterranean areas
- Effects of reclaimed water irrigation
- Glacial and periglacial geomorphology
- Water and geology of Mars

OFFERED SERVICES

- Studies and reports related with the research lines described

MARKETABLE RESULTS

Universidad de Alcalá

SUSTAINABLE CATALYTIC PROCESSES WITH ORGANOMETALLIC COMPOUNDS

Code
728

SOSCATCOM

RESEARCH AREA

Experimental Sciences

COORDINATOR

Marta E. G. Mosquera
Gerardo Jiménez Pindado

KEY WORDS

Organometallic chemistry, Catalytic processes, Bioplastics, ROP polymerization, Green catalytic oxidation, Small molecules activation

AIM

- Chemical Industry
- Plastics Industry
- Packaging
- Coatings

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SOSCATCOM

ABOUT US

SOSCATCOM group belongs to the Inorganic Chemistry area in the University of Alcalá and has a strong expertise in the development of catalysts for polymerization, green oxidation and hydrogenation reactions. Recently their research activity has been oriented towards CO2 valorisation, polymerization of functionalized monomers and monomers coming from renewable resources. Their work includes the design and synthesis of new species mono and polymetallic based in Earth abundant elements such as Al, Zn, Ti, Fe and alkali metals and in the study of their activity in catalytic processes. Their interest also expands towards the development of catalysts active for bioplastics generation. Another research line in progress is focused in the study of the influence of non-covalent interactions in polymerization reactions and organic transformations.

RESEARCH AREA

- Homo and heterometallic complexes of Earth abundant metals
- Polymerization of renewable monomers and multifunctional monomers
  CO2 and small molecules activation
- C-H and C-X bond activations, C-C bond formation promoted by block p metals
  C-C and C-E bond formation catalyzed by titanium complexes in low oxidation states
- Synthesis and characterization of nanocatalysts via the anchoring of titanium complexes to silica nanoparticles
- Synthesis and characterization of homogenous catalysts for oxidation processes using green oxidants
- Mechanistic studies of stochiometric and catalytic processes mediated by metal complexes
- Design of polymers with advanced properties
- Development of hybrid photocatalysts for CO2 reduction

OFFERED SERVICES

- Research in Organometallic Chemistry: synthesis, characterization and catalytic applications of organometallic compounds
- Design of polymers with advanced properties
- Bioplastics from renewable resources
- Teaching and training in Inorganic Chemistry and in Sustainable chemistry in Postgraduate programs

MARKETABLE RESULTS

Universidad de Alcalá

REACTIVITY AND MOLECULAR STRUCTURE

Code
806

RESMOL

ÁREAS DE APLICACIÓN

Ciencias Experimentales

COORDINADOR

Luis Manuel Frutos Gaite

PALABRAS CLAVE

Química cuántica, Fotofísica y fotoquímica teórica, Fotomecanoquímica, Mecanismos de reacciones químicas, Estudio teórico complejos metálicos, Mecanofotoquímica, Mecanoquímica

MERCADO OBJETIVO

- Sector industrial

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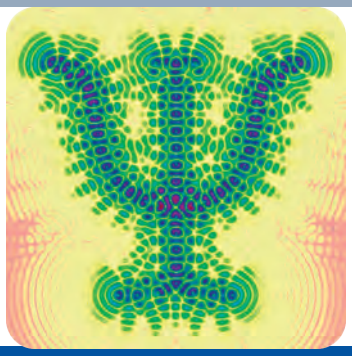

OBJETO DEL GRUPO

La actividad investigadora del grupo se centra en el estudio teórico de procesos químicos tanto en estado fundamental como en estado excitado, de manera muy particular en los aspectos mecanísticos y dinámicos de estos procesos. Por un lado el grupo desarrolla modelos teóricos y computacionales para el estudio de diversos procesos moleculares, así como su implementación computacional a través del desarrollo de software específico. Dentro del estudio de procesos en estados excitados, el grupo está especializado en la determinación con métodos multiconfiguracionales de los aspectos mecanísticos y cinéticos de reacciones fotoquímicas en sistemas moleculares (interruptores y motores moleculares,…) y biológicos (proteínas fotoactivas, ADN,…). Además, dentro del estudio de procesos en estados excitados, el grupo ha desarrollado modelos y estudiado sistemas sometidos a fuerzas externas (mecanoquímica y fotomecanoquímica). Asimismo, el grupo cuenta con experiencia en el estudio de procesos de transferencia de energía y carga. Finalmente, el grupo también cuenta con una amplia experiencia en el estudio de la reactividad y propiedades electrónicas y moleculares de complejos organometálicos.

LÍNEAS DE INVESTIGACIÓN

- Estudio químico cuántico de procesos y sistemas moleculares. Estudio de la fotoreactividad de dispositivos moleculares: interruptores y motores moleculares
- Estudio teórico y computacional de la mecanoquímica y fotomecanoquímica de sistemas moleculares
- Estudio de la reactividad y propiedades electrónicas y moleculares de complejos organometálicos
- Desarrollos de modelos computacionales para procesos fotoinducidos
- Desarrollo de software en química computacional.

SERVICIOS OFERTADOS

- Diseño computacionalmente asistido en moléculas con características y propiedades fotoactivas concretas con posible aplicación en nanotecnología y farmacología

RESULTADOS COMERCIALIZABLES

Universidad de Alcalá

IBERIAN PALAEONTOLOGY

Code
824

PALEOIBÉRICA

RESEARCH AREA

Experimental Sciences

COORDINATOR

Fernando Barroso Barcenilla

KEY WORDS

Invertebrate and vertebrate palaeontology, Stratigraphy, Taphonomy, Earth Sciences

AIM

- Educational centers
- Municipalities
- Councils
- Autonomous Communities

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Paleolbérica

ABOUT US

Research Group of the University of Alcalá (UAH), with the participation of researchers specielized in different Palaeontological áreas from other Spanish and Portuguese universities

RESEARCH LINES

- Palaeontology of Mesozoic marine and terrestrial ecosystems of the Iberian Peninsula
- Biostratigraphy
- Taphonomy
- Palaeohistology
- Didactics of Earth Sciences

OFFERED SERVICES

- Geological evaluation advisory and consulting
- Palaeontological interventions
- Taphonomic and palaeohistological studies
- Restoration and curation of fossils
- Design and development of didactic activities
- Organization of scientific outreach events

MARKETABLE RESULTS