## NANO-HOST

**Overview**. This project is aimed at generating new fundamental knowledge and fostering new prospects and frontiers, training and transfer of knowledge in the field of highly efficient, highly selective, supported, recyclable catalysts. Targets of the research programme are strongly innovative methodologies for the preparation, recovery and reuse of single-site, multipurpose, nanostructured catalytic materials, and the engineering of reactors based on these catalysts, as this represents an essential part towards the elaboration of sustainable production processes of high-added value fine chemicals. The approach pursued will be the immobilization of homogeneous catalysts, and particularly transition metal complexes, onto preformed (in)soluble supports (heterogenised catalysts). Materials defined at the nanometric level obtained by surface organometallic chemistry will be included. The focus will be on their applications on specific, selected reactions. In this project, we plan to use advanced catalyst design to develop catalysts in which the support allows improvements in terms of activity, selectivity, catalyst lifetime and versatility, compared to their homogeneous counterparts. This will be an interdisciplinary, jointly executed research project encompassing complementary, synthetic (inorganic supports, ligands, organometallic compounds, functionalized polymers, dendrimers, nanoparticles), reactivity (homo- and heterogeneous catalysis), characterization (of materials and in situ), engineering (continuous / supercritical flow reactors) and modelling activities.

The network aims at implementing a joint training programme directed to a high-level, high-competency multisectorial education of early stage and experienced Fellows.

*Starting date: 01/10/2008*
*Duration 48 months*

*The maximum Community contribution to the project is about 3,385,000 €.*

## INITIAL TRAINING NETWORKS

**Objective**. To improve young researchers' career prospects in both the public and private sectors. This will be achieved through a transnational networking mechanism, aimed at structuring the existing high-quality initial research training capacity.

**What is funded.** The networks are built on joint research training programmes, responding to well identified training needs in defined scientific areas, with reference to interdisciplinary and newly emerging supra-disciplinary fields. Support is provided for:

- Recruitment of researchers who are within the first five years of their careers in research for initial training.
- Recruitment of Senior Visiting Scientists of outstanding stature in international training and collaborative research.
- Networking activities, organisation of workshops and conferences, involving the participants own research staff and external researchers.

Training is focused on scientific and technological knowledge through research on individual, personalised projects, complemented by substantial training modules addressing other relevant skills and competences. Researchers are normally required to undertake trans-national mobility when taking up appointment.

**Participants.** Organisations members of a network selected by the Commission which contributes directly to the implementation of the joint research training programme of the network, by recruiting and employing and/or hosting eligible researchers an by providing specialised training modules.

*NANO-HOST*

*Homogeneous Supported Catalyst Technologies:*
*the sustainable approach to highly-selective, fine chemicals production*

**Seventh Research Framework Programme (FP7)**

Initial Training Network

Funded by the European Commission
FP7 - The People Programme
Call FP7-PEOPLE-2007-1-1-ITN, Proposal no. 215193-2

*Coordinating Institution: CNR*
*Via Madonna del Piano 10*
*50019 Sesto Fiorentino, Italy*

*www.nanohost.eu*

**Network partners.** The Network includes seven participants whereas the work will be carried out by different teams:

**Consiglio Nazionale delle Ricerche**
Istituto di Chimica dei Composti OrganoMetallici - Firenze
Istituto di Scienze e Tecnologie Molecolari - Milano

**Centre National de la Recherche Scientifique**
Laboratoire de Chimie, Catalyse, Polymères et Procédés - Lyon
Institut Charles Gerhardt - Montpellier

**Consejo Superior de Investigationes Cientificas**
Instituto de Investigaciones Químicas - Sevilla
Instituto de Ciencia de Materiales de Aragón - Zaragoza

**Katholieke Universiteit Leuven**
Katholieke Universiteit Leuven - Leuven

**The University Court of the University of St. Andrews**
School of Chemistry - St. Andrews

**BASF Nederland B.V.**
Catalyst Research Center **-** De Meern

**National Research School Combination Catalysis**
Technische Universiteit Eindhoven - Eindhoven
Utrecht University - Utrecht

All participants are members of the FP6 Network of Excellence IDECAT

IDECAT
Integrated Design of Catalytic Nanomaterials for a Sustainable Production

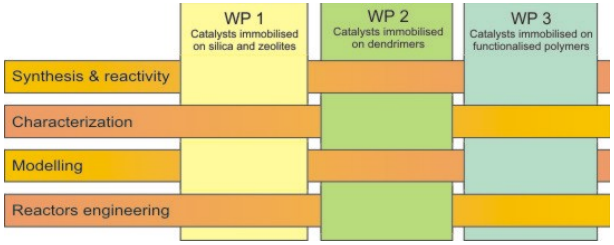
**Associated partners.**
Dowpharma - Chirotech Technology Limited
Bruker BioSpin S.r.l.
Hybrid Catalysis B.V.
Science and Technology Facilities Council - ISIS Pulsed Neutron & Muon Source

**Research programme.** The research activities carried out by NANO-HOST are based on a *jointly executed research programme*. The scientific work is broken down into three Work Packages with identified tasks.

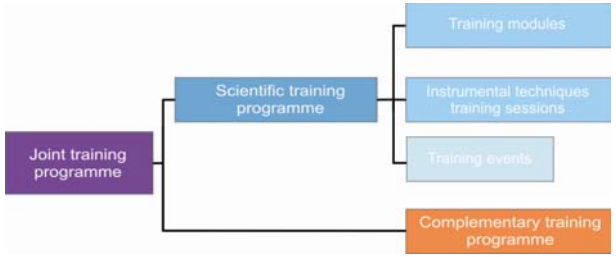
WP1 “Catalysts immobilized on silica and zeolites” is centred on: a) the development of innovative strategies for the design and the mastered elaboration of micro- and mesoporous inorganic matrices with structured porosity and controlled surface properties, b) the immobilisation of homogeneous catalyst precursors on these matrices, c) the use and recycle of the heterogenized catalysts in selective reactions, d) development of (super critical) flow / monolithic reactors.

WP2 “Catalysts immobilized on dendrimers” is centred on the design and the synthesis of new dendritic materials and nanoparticle hybrids, and the catalysts based on them, and their use in chemical transformations with enhanced selectivity.

WP3 “Catalysts immobilized on functionalised polymers” is centred on the development of methodologies for covalent and non-covalent immobilization of metal complexes onto functionalized organic or hybrid polymers: latex polymers, ion-exchange resins, carbon nanotubes, metal-organic frameworks, metal oxide nanotubes, polymer ligands.




**Training programme.** The *jointly executed training programme* is based on a comprehensive set of *scientific* and *complementary elements* and in an appropriate number of *training events*. The programme includes multi-lateral collaborative research / training projects and those of the individual recruited researchers.




The *scientific training programme* will be *fully integrated with the research activity* of the Network and will include:

- *training modules*, corresponding to the research activities required to accomplish the goals of the project,
- a set of advanced *instrumental techniques training sessions*,
- an appropriate number of *training events*.

The elements of the scientific training programme will be provided by the recruiting institutions and by secondments. The recruiting institutions will afford the primary training. Secondments will include visits, short stays, stages, attendance to courses, etc. and they will be carried out at the collaborating institutions.
The *complementary training programme* will include a set of skills coherent with the overall activities of the Network. The complementary activities will be offered by the recruiting institutions, by secondments and by the associated partners.

The Network as a whole will provide training activities for a total minimum of 530 person-months of Early Stage (12) and Experienced Researchers (10) whose appointment will be financed by the contract.