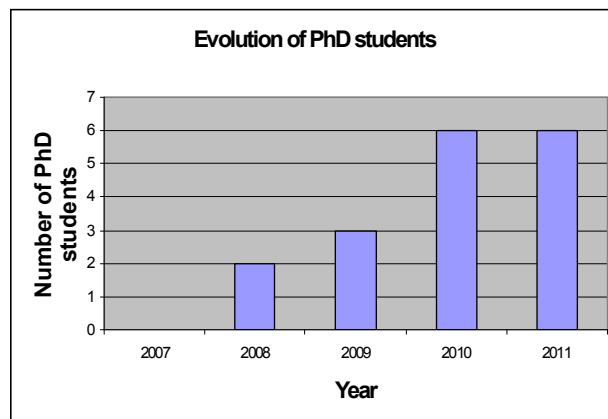
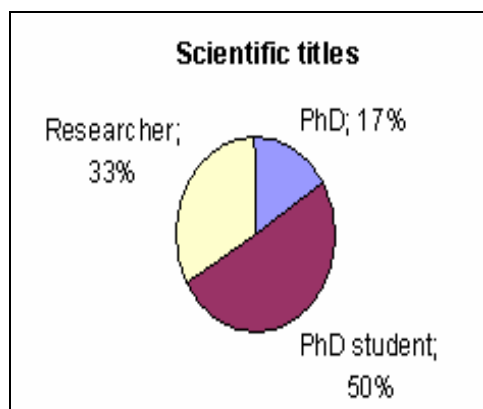


E 7: COLLOIDS AND SURFACES. INDUSTRIAL AND ENVIRONMENTAL APPLICATIONS.

Team consists of **11 researchers**- two senior researchers first degree, two senior researchers second degree, three researcher third degree, three researchers, one researcher assistant and 5 technicians.

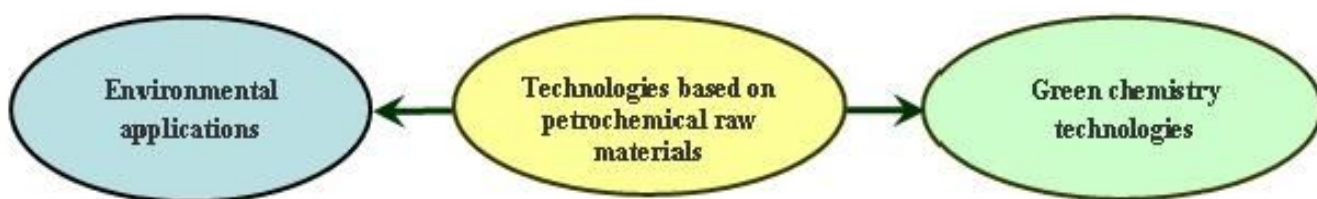


Description of the research domain

The research domains of the team refer to:

- Surfactants-new types, technology development, studies on surface activity of new types of surfactants and applied colloidal chemistry for industrial applications-metal working, nuclear power plant;
- Interdisciplinary research in the field of valorization of natural resources and industrial waste remediation technologies and the development of industrial gas and liquid streams decontamination - through mesoporous materials obtained by surface modification of natural zeolites;
- Valorization of bio renewable raw materials for obtaining additives and bio refinery products.

The activity in the last four years of the research team turned to the shift from classical technologies based on fossil raw materials processing, to the principles of green chemistry including the use of renewable raw materials. Applied research in this direction has an interdisciplinary character and environmental application:



The **main objectives** of team research activities were:

New technologies for manufacturing surfactants:

- Use of renewable raw materials to the manufacture of surfactants.

Studies on surface activity of new types of surfactants and applied colloidal chemistry:

- Surfactants based colloidal systems without negative impact on the environment, used for machining metal surfaces;
- Protect the environment by radioactive liquid waste conditioning;
- Preparation of peptide surfactants results in the valorization of protein waste.

Interdisciplinary research in the field of valorization of natural resources and industrial waste remediation technologies and the development of industrial gas and liquid streams decontamination:

- Development of the type Me-ZN catalysts (Me = Cu, Co, Mn, ZN = natural zeolite) by adsorption processes and / or ion exchange, catalysts effective for environmental applications: removal of VOCs, NO_x from industrial gas streams;
- Mesoporous obtaining materials (tailored) by functionalization of natural zeolites with organic compounds (quaternary ammonium salts, alkyl amines, oxygenates). The new structures with specific characteristics can be used in gas separation, purification of water with high content of hydrocarbons, dyes, oxyanions;
- Obtaining natural zeolites of different mineral deposits (with variable content of clinoptilolite) and industrial waste (red mud, an aluminum industry waste). New textural features by chemical and / or unconventional procedures;
- Obtaining natural zeolite-based composite with lamellar compounds of type hydrotalcites or modified red mud adsorbent properties and mechanical strength and heat; Remediation of waste water by physicochemical treatments (adsorption, ion exchange, flocculation, filtration);

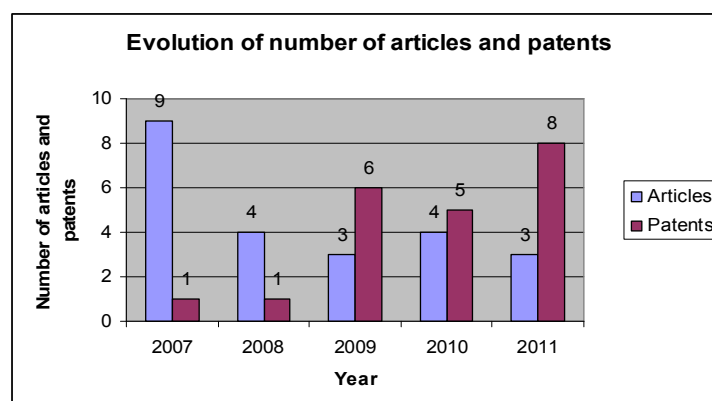
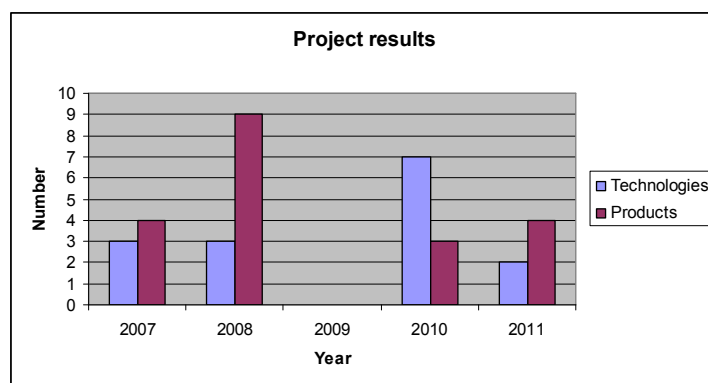
Valorization of bio renewable raw materials for obtaining additives and bio refinery products:

- New procedures for valorization of glycerol obtained in biodiesel synthesis;
- Glycerol valorization for obtaining non pollutants fuels and anti freezing additives;
- Hydrogen obtaining from bio renewable sources.

Analysis and evaluation:

- Development and accreditation of a laboratory for analysis of emissions from waste incineration process according to EU Directives transposed in GD. 128/2002.;
- Making the physical-chemical and detergent performance evaluation.

Major achievements:

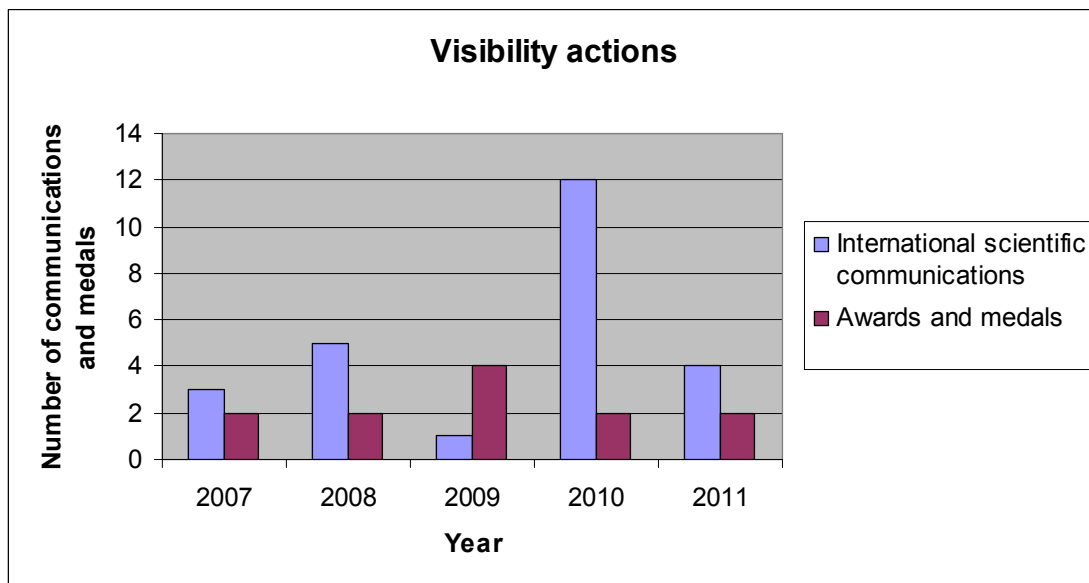


At the request of the Ministry of Economy in 2008-2010 was elaborated a prospective study on **"Refining and petrochemicals industry-present and perspectives. Strategic elements for increasing competitiveness"**.

Strategic partnerships:

- PhD. Dimiter Balabanski senior researcher first degree at Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria. He is partner in strategic cross border project "Integrated Management Danube WATER (WATER).
- PhD Joachim Sanchez Leal- senior researcher first degree, member of Comitee Espanol de la Detergencia y Afines, Barcelona, Spain, a recognized expert in the field of surfactants.

Visibility actions:



Other significant aspects

- Experience and results in radioactive waste management led to the **Romania-Bulgaria cross border project "Integrated Management Danube WATER (WATER)"**, selected for funding in May 2011. In this project ICECHIM, RAAN-SCN, UPB and Institute of Nuclear Physics, Bulgaria will develop technologies for decontamination and conditioning of liquid waste resulted from the Cernavoda and Kozloduy nuclear power plants. The project is funded 84% of European funds ERDF. The project is in pre contracting phase.
- Experience and results of the research in the field of removal of radionuclides on emulsion liquid membranes are based on a **PhD thesis** author Irina Chican, the sentence in which the novelty consist in selection of an oil waste transporter.