

REGISTRATION FORM (deadline for registration 31st of July)

Mr., Ms., Dr., Prof. (circle one)

First Name: _____

Family Name: _____

Organization/Institution: _____

Address: _____

_____ **Postal Code:** _____

City: _____ **Country:** _____

E-mail: _____

Phone: _____

Fax: _____

ACCOMMODATION RESERVATION

Hotel NH Aranzazu****

For reservation, please contact NH Aranzazu Hotel (nharanzazu@nh-hotels.com, Phone: +34-943-219077. Fax: +34-943-219050), providing the reference "EMULSION COURSE 2010".

Olarain Residence

For reservation, please contact Olarain Residence (reservas@olarain.com, Phone: +34-943-003300. Fax: +34-943-003309) for registration there, providing the reference "EMULSION COURSE 2010".

FEES

In-site attendance _____ 1,250 €

On-line attendance _____ 2,000 €

METHOD OF PAYMENT

Bank transfer Check payable to POLYMAT

Payment by credit card is not accepted.

Emulsion polymers are truly "products by process" materials, whose properties are determined during the polymerization process. The course will focus on the understanding of the fundamental basis of emulsion polymerization and on the use of this understanding to manipulate process conditions to achieve a consistent production of improved products. The fundamentals of latex rheology, film formation and adhesion of polymers, key aspects in the application of emulsion polymers, will also be studied.

For more information, to register or to request another printed copy of the brochure, please contact:

Dr. Monika Goikoetxea

POLYMAT

Joxe Mari Korta Center

The University of the Basque Country

Donostia-San Sebastián, 20018, SPAIN

Phone: +34-943-018476

Fax: +34-943-017065

E-mail: emulsioncourse@sc.ehu.es

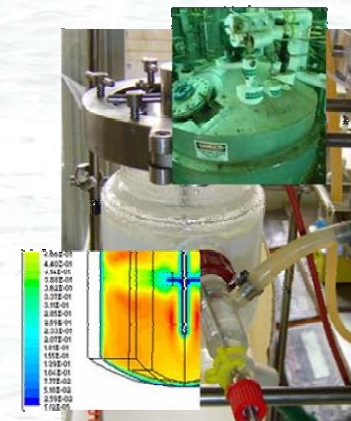
Or visit our web site:

(including on-line registration) at:

www.sc.ehu.es/qpwilp/EPP_2010.htm

Course on EMULSION POLYMERIZATION PROCESSES

September 6-10, 2010



**Universidad
del País Vasco**

**Euskal Herriko
Unibertsitatea**

POLYMAT

PROGRAM AND COURSE OUTLINE

Monday, September 6, 2010

13.30-14.30 Registration

14.30-16.30 Features of Emulsion Polymerization (Prof. José M. Asua, POLYMAT)

Processes occurring in emulsion polymerization. Similarities and differences with other polymerization techniques in dispersed media (miniemulsion, microemulsion and dispersion polymerization). Reactors. Applications of polymer dispersions.

16.30- 17.00 Coffee Break

17.00-18.00 Seminar on kinetic measurements (Prof. María J. Barandiaran, POLYMAT)

How to run an experiment. Determination of kinetic measurements from experiments.

Tuesday, September 7, 2010

8.30-10.30 Kinetics of Emulsion Polymerization (Prof. José M. Asua, POLYMAT)

Factors affecting polymerization rate. Radical entry: processes involved; effects of water solubility of monomers and initiators, characteristics of the surface of the polymer particles. Radicals exit: processes involved; factors affecting radical exit (water solubility of monomers and initiators, particle size, characteristics of the surface of the polymer particles). Radical termination. Average number of radicals/particle. Monomer partitioning: thermodynamically controlled systems; mass transfer limitations.

10.30-11.00 Coffee Break

11.00-13.00 Stability of Polymer Colloids (Prof. José M. Asua, POLYMAT)

Colloidal stability. Mechanisms affecting dispersion stability. Electrostatic stabilization. Overcharging. Steric stabilization. Total potential energy of interaction. Flocculation of systems sterically stabilized. Electrosteric stabilization. Aggregation kinetics.

13.00-14.30 Lunch

14.30-15.30 Particle Nucleation and Particle Size Distribution (Prof. María J. Barandiaran, POLYMAT)

Description of the mechanisms for particle nucleation. Particle size distribution. Effect of the formulation and process conditions.

15.30-16.30 Miniemulsion Polymerization (Dr. Monika Goikoetxea, POLYMAT).

Scientific basis for the preparation of monomer miniemulsions: homogenization; thermodynamic and kinetic stabilization. Effect of preparation conditions and of the miniemulsion formulation on the polymerization. Applications.

16.30-17.00 Coffee Break

17.00-18.00 Visit to POLYMAT laboratories

21.00 Conference dinner

Wednesday, September 8, 2010

9.00-11.00 Molecular Weight Distribution (Prof. José R. Leiza, POLYMAT)

Introduction. MWD in linear polymerization: Rigorous modelling compartmentalization, MWD for a 0-1 system. MWD in non-linear systems: computation of sol MWD and gel content. Numerical and experimental examples.

11.00-11.30 Coffee Break

11.30-12.30 Particle Morphology (Prof. José M. Asua, POLYMAT)

Thermodynamic and kinetic aspects for particle morphology control.

12.30-13.30 Latex Rheology (Prof. José M. Asua, POLYMAT)

Key aspects affecting the viscosity of waterborne polymer dispersions. Equations for dispersion viscosity Thickeners.

13.30-15.00 Lunch

15.00-17.00 Advanced Research Topics: Bases and Applications of CFRP in Dispersed Media (Prof. Bernadette Charleux, CNRS, Laboratoire de Chimie et Procédés de Polymérisation)

Bases and applications of controlled/living radical polymerisations (CFRP) carried out in the presence of water. Challenges for adapting CFRP to water dispersions. Emphasis on future opportunities and open issues.

17.00-17.30 Coffee Break

17.30-18.30 Seminar on Latex Characterization (Prof. José R. Leiza, POLYMAT)

Copolymer composition. Molecular weight distribution. Gel content.

Thursday, September 9, 2010

9.00-10.30 Emulsion Polymerization Reactors (I) (Dr. María Paulis, POLYMAT)

Reactor types. Reactor equipment for mixing. Power consumption. Agitation requirements for emulsion polymerization. Mass transfer limitations. Heat transfer. Predicting the performance of emulsion polymerization reactors: Mass, energy and population balances. Evolution of characteristics in the different operation modes.

10.30-11.00 Coffee Break

11.00-12.00 Emulsion Polymerization Reactors (II) (Dr. María Paulis, POLYMAT)

Determination of safety parameters. Scale up. Residual monomer removal: devolatilization and postpolymerization.

12.00-13.00 On-line Monitoring (Prof. José R. Leiza, POLYMAT)

Sensor selection. Latex gas chromatography. Head-Space gas chromatography. Densimetry. Ultrasound. Spectroscopic techniques. Reaction calorimetry. Raman vs calorimetry. Experimental results.

13.00-14.30 Lunch

14.30-15.30 Control of Emulsion Polymerization Reactors (Prof. José R. Leiza, POLYMAT)

Open-loop and close-loop strategies. Close-loop for linear polymers: Optimal trajectories; Examples of safe optimal control of composition and MWD; Final property control. Unsolved issues in closed-loop control.

15.30-16.00 Coffee Break

16.00-18.00 Waterborne polymer/inorganic hybrids (Dr. E. Bourgeat-Lami, CNRS, Laboratoire de Chimie et Procédés de Polymérisation)

Overview of the basic principles and main synthetic procedures involved in the synthesis of organic/inorganic colloid through heterophase polymerization. Recent advances on the control of particles morphology and polymerization kinetics. Typical examples including the incorporation of titanium dioxide, silica, magnetic particles and clay colloids into polymer particles.

Friday, September 10, 2010

8.30-10.30 Film Formation of Waterborne Coatings (Prof. Joseph L. Keddie, University of Surrey)

Stages of film formation: drying, particle deformation and interdiffusion. Fundamental driving forces for particle coalescence. Introduction to key analytical techniques and review of experimental results. Effects of surfactant, pigment and particle nanostructure on film formation.

10.30-11.00 Coffee Break

11.00-13.00 Properties of waterborne Pressure-Sensitive-Adhesives (PSA) (Dr. Costantino Creton, École Supérieure de Physique et Chimie Industrielles).

General principles governing adhesion of PSA and application to acrylic waterborne systems. Relationship between monomer composition and molecular weight and final film properties. Role of particle size and particle structure. Effect of acrylic acid and gel fraction on deformation and adhesive properties of the dry film.

13.00 End of the course.

PARTICIPANTS

The course is designed for scientists and engineers from industry and academia actively interested in emulsion polymerization. English will be the official language of the course.

ATTENDANCE MODALITIES

Two options: 1) personal in-site attendance ; 2) on-line web-course using videostreaming.

LOCATION AND TRANSPORT FACILITIES

The course will take place in Joxe Mari Korta Building in The University of the Basque Country Campus in Donostia-San Sebastián. It is easily accessible by plane via the Donostia-San Sebastián Airport (30 minutes away by taxi), Bilbao airport (60 minutes away by taxi) and Biarritz Airport (in France, 40 minutes away by taxi).

ACCOMODATION

A limited number of rooms has been blocked at special rates, in a hotel and a residence near the course location. Modern single rooms in the Olarain university residence are available at a rate of 59.12 € The four stars Hotel NH Aranzazu offers rooms at a rate of 104.60 € Rates in both cases include a buffet breakfast. Each participant should arrange directly his reservation and will be charged by the hotel for room costs and extras. Please note that availability and price of these rooms are guaranteed until the 30th of June.

COURSE FEES

The course fee is 1,250 € for in-site assistants (free of transfer charges) and covers attendance, course notes and conference dinner. The on-line web based attendance fee is 2,000 € (including course notes). Company members of the Industrial Liaison Program in Polymerization in Dispersed Media may register two people free of charge. Additional personnel from these companies may also register at half of the regular fee. On-line assistance from these companies will be at a rate of 1,000€

PAYMENT METHOD

The payment of the course fee can be made by a check payable to "POLYMAT-Ingeniería Instituto Materiales Poliméricos", or by bank transfers to **IBAN: ES 36 2101 0381 06 0012481495** (Bank: Caja de Ahorros y Monte de Piedad de Guipúzcoa y San Sebastián, "KUTXA", Plaza Benta Berri s/n, 20009 Donostia-San Sebastián) with the SWIFT code: CGKES22. If this second choice is used, please reference your name and the full name of your company and fax a copy of the bank transfer papers to us.