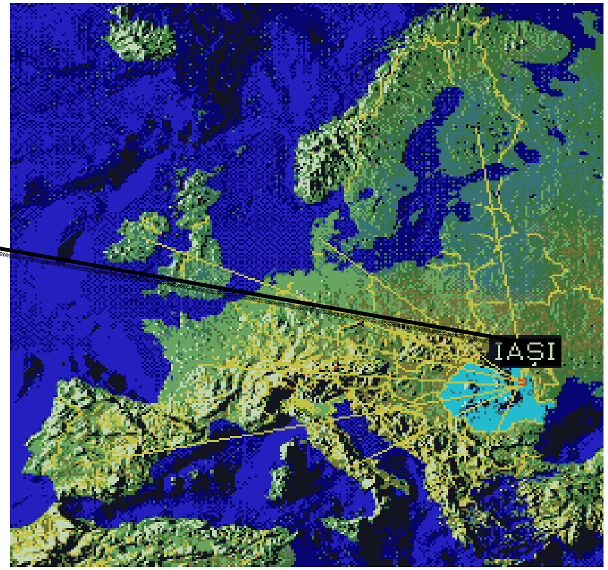
“Petru Poni” Institute of Macromolecular Chemistry - Institute of Excellence of the Romanian Academy

Bogdan C. Simionescu

Member of the Romanian Academy

bcsimion@icmpp.ro


IAŞI

"Petru Poni" Institute of Macromolecular Chemistry (ICMPP)

- founded in 1949 as an institute of the Romanian Academy
- Institute of Excellence of the Romanian Academy
- ranked in the first/ second/ third position among the 64 institutes/ centres of the Romanian Academy; second/ third position on the list of most innovative research/high education bodies in Romania
- internationally recognized – ISI, Philadelphia, USA, lists the Institute among the "main Romanian actors on the international scientific scene"

Personnel
- Total - 284
- researchers - 109
- PhD students - 50 - 60
- young researchers (less than 35 years old): 30%
- personnel with university degree: 175
- PhD thesis promoters: 9

Prof. Bogdan C. Simionescu
bcsimion@icmpp.ro
Dr. Anton Airinei
airineia@icmpp.ro
Dr. Valeria Harabagiu
hvaleria@icmpp.ro

Mission/performance indicators

- ❑ Basic research in polymer science
- ✓ yearly more than 170 papers, books, book chapters
- ✓ yearly more than 200 presentations in scientific meetings

- ❑ Applied research, technology transfer and small scale production
- ✓ industrial technologies for silicones, polyurethanes, ion exchangers, thermally resistant polymers
- ✓ specialty polymeric materials

- ❑ Education & training (PhD, post-doc)

- ❑ Services
- ✓ consultancy – preparation and processing of polymeric materials
- ✓ transfer of knowledge, certification for polymeric materials

Cooperation Network

- **National cooperation**

✓ **universities, research institutions, companies, SMEs**

✓ **the Institute coordinates *5 Romanian consortia* and is involved in more than *70 multi-partner national grants***

- **International cooperation**

✓ **more than 50 research / high education centres in Europe, Japan, China, USA and Canada**

- **International cooperati**

European projects

- ✓ FP3 - partner in 3 projects (COST-PECO, PECO ERBIC IPDCT, INCO - COPERNICUS - ERBIC)
- ✓ FP5 - partner in 5 projects (2 INTAS, 1 CRAFT, 2 GROWTH)
- ✓ FP6 - partner in 7 projects (NoE, IP), project coordinator of SSA project RAINS
- ✓ FP7 - partner in 4 projects, 3 projects under second evaluation
- ✓ COST - partner in 6 COST Actions

❑ EuMaT Technology Platform, ENMat Platform

RAINS
FP6-2004-ACC-SSA-2

BIOMAHE
Biodegradable Polymeric Materials
for Health and Environment

MINILUBES

Scientific expertise / excellence

I. New synthetic polymers

Silicon - based monomers and polymers

- organohalogensilanes; organolithium and carbosilane precursors of polycarbosilanes; linear and cyclic functional carbosiloxanes; polysilanes

- macrocyclic heterosiloxanes as precursors for ceramic materials or carriers for liquid membranes; coordination polymers

- well-defined silico- and organofunctional polysiloxanes; heterogeneous catalysed polymerization

- siloxane containing block and graft copolymers (siloxane-vinyl, amide, ester, carbonate, alkylene oxide, pyrrole, sulfone, N-acyliminoethylene)

- siloxane elastomers, protective coatings, adhesives

Scientific expertise / excellence

Heteroatomic monomers, thermally stable and flame resistant polymers

- monomers and polymers with maleimide structure
- flame resistant and thermally stable compounds with P, halogen, S and N atoms
- heterocyclic, crosslinkable polyamides
- direct synthesis of polyamides, polyesters, polyhydrazides, polyureas
- thermally stable polymers (imide polymers and copolymers, aromatic amide polymers and copolymers)
- aromatic polysulfones

Urethane polymers

- kinetics and mechanism of polyurethanes synthesis starting from 4,4’ -dibenzyldiisocianate
- parabanic polymers and copolymers
- binary and ternary urethane copolymers
- urethane ionomers (cationomers, anionomers and zwitterionomers)

Scientific expertise / excellence

Linear and non-linear polyelectrolytes

- synthesis and characterization of ion exchangers
- interaction of polyelectrolytes with metal ions, organic and inorganic compounds, dyes, flocculants
- interpolyelectrolyte complexes
- polyelectrolytes in ecological and biomedical applications

Unconventional polymer synthesis methods

- electroactive polymers (conjugated polyazomethines, polyvinylenes, polyaniline and polypyrrole)
- plasma chemistry (thin films, prebiotic chemistry: the origins of life)
- crosslinking of polymers by radical/cationic photochemical reactions
- transparent layers of conjugated azo-aromatic polymers obtained by photolysis and/or thermolysis of aromatic diazides; photoconduction properties
- kinetics of *trans-cis* photoisomerization and *cis-trans* thermal recovery of azobenzene and cinnamate chromophores incorporated into poly(vinyl chloride) and styrene - maleic anhydride copolymers
- magnetic or electric field polymerization of vinyl monomers; adhesives

Scientific expertise / excellence

II. Chemical modification of natural polymers. Bioactive and biocompatible polymers

Bioactive and biocompatible polymers

- maleic anhydride based copolymers
- functionalization of extracellular microbial or native polysaccharides, cyclodextrins, cellulose and polyhydroxyalcanoates
- natural polymers/bioactive substances (drugs) conjugates with controlled release
- bile acids
- cationic polysaccharides interactions

Chemically modified celluloses. Biomass

- physical (extraction), chemical and/or biochemical modification of biomass components
- enzymatic hydrolysis of cellulose
- polyphenols
- lignin - synthetic polymer blends; composite materials based on wood derivatives and synthetic polymers obtained by *in situ* polymerization
- synthetic polymer resins

Scientific expertise / excellence

III. Polymer characterization. Polymer solutions. Compatibility, solid state characterization of polymers

- investigation of mechanical, electrical and thermal properties of materials, electrical conductivity and photoconductivity as well as of the behavior under heat, light and electric field, to provide information on the lifetime of materials and their impact on the environment
- methods to control the quality of industrial products
- methods to study natural polyelectrolytes (nucleic acids, proteins or ionic polysaccharides), to provide information for life sciences (molecular biology, microbiology and virusology), pharmacy and medicine

Scientific expertise / excellence

IV. Environment protection and energy conservation

- new, clean sources of energy, by using maleic polyelectrolytes as antiscale agents in the exploitation of geothermal water
- the management of soils and the enhancement of agricultural production through soil conditionners based on maleic acid copolymers
- reduced eutrophication of waters through maleic polyelectrolytes as phosphate substitutes
- prevention of pollution with chromium (tanning processes)
polymers for waste water treatment, purification of biological liquids
- protecting of the environment against pollution by polymer waste resulted from industrial and household activities
- short-term or controlled life time polymer materials, to reduce the amount of natural waste residues and to remove the generated waste by destructive procedures as pyrolysis

THANK YOU FOR YOUR ATTENTION!