Research offer in the field of polymer materials chemistry and technology

Studies of materials resistance (mainly polymers) to wide range of environmental factors (investigation of photo-, thermo-, and biodegradation processes in laboratory as well as natural tests)

Modification of polymers to achieve tailored properties (including stabilization and sensibilization)

Preparation of (nano)composites using polymeric matrix with a variety of inorganic and natural plant fillers

Investigations of modern and effective biocides for different materials: (co)polymers, (nano)composites, polymer coatings and construction materials

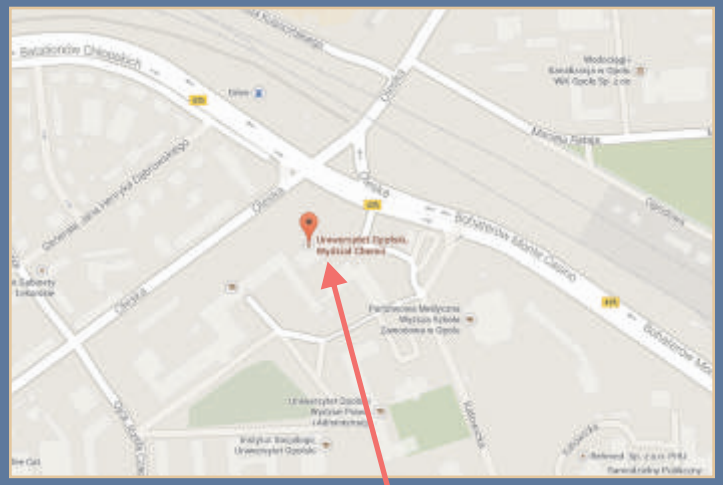
Development and preparation of catalysts for polymerization; characterization of the catalysts

Studies of polymerization and copolymerization processes (mainly according to coordination mechanism) also in ionic liquid two-phase systems (reaction mechanism and kinetics, catalysts stability)

Characterization of materials properties: structural (FTIR, NMR, TREF), molecular (HT-GPC), thermal (DSC, TG, TG-MS), mechanical (impact strength), rheological (mel flow rate) and morphological (SEM)

Join us for cooperation

Welcome



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Opole 2014

Faculty of Chemistry
Division of Chemical Technology
and Polymer Chemistry

Scientific staff and PhD students

catalyst
synthesis
(co)polymerization
weathering
biodegradation
photodegradation
(co)polymers
(bio)composites
(nano)composites

www.polimery.uni.opole.pl

Modern equipment for complex investigations

Weathering of materials

- accelerated weathering facility Weatherometer & Xenotest (sunlight resistance tests); simulation of outdoor (external) and indoor (behind the window test) conditions



- natural weathering facility (environmental) with full weather data acquisition

Polymers molecular and structural characterization

- high-temperature gel-permeation chromatography with triple detection
- preparative fractionation of polymers using TREF technique
- FTIR spectrometers (with ATR)
- NMR spectrometer (400 MHz)


Materials morphology

- scanning electron microscope with EDS system (mapping of surface composition)

Physical & mechanical properties of polymeric materials

- thermal properties:
  - thermogravimetric analyzer with Mass Spectrometer (quantative and qualitive analysis of thermal decomposition) differential scanning calorimeter (thermal transitions also in low temperatures)

- plastometer – determination of melt flow index (MFR and MVR)

- pendulum impact tester (impact strength according to Charpy tests, Izod tests and tensile impact tests)

- testing machine for tensile strength (polymeric films)
- Shore D hardness tester

- lab mini-extruder & mini-injection moulding machine
- laboratory extruder with die for film extrusion and granulate

Catalysts synthesis and polymerization

- laboratory equipment for catalysts synthesis and polymerization (studies of catalyst activity and performance):
  - argon-vacuum lines for Schlenk technique
  - pressure reactors for polymerization processes with gas and liquid monomers

Scientific publications (last 10 years)

2 monographic publications
2 chapters in monographic publications
107 original papers in journals ISI Master Journal List
82 graduates with MSc
9 graduates with PhD
11 patents
11 patent applications
205 contracted services for different institutions

Financing from external sources (last 10 years)

15 research projects financed by Committee for Scientific Research, Ministry of Science and Higher Education, National Science Centre

2 consortium projects financed from Innovative Economy Operational Programme (EU)

1 consortium project financed by The National Centre for Research and Development

3 infrastructure projects (modern scientific equipment) financed from Regional Programme for Opolskie Voivodeship, Ministry of Science and Higher Education