Leibniz-Institut
für Polymerforschung
Dresden

DRESDEN concept

Leibniz Gemeinschaft

Electron beam technology

The Leibniz-Institut für Polymerforschung Dresden e. V. has several modern and versatile electron emitters and accelerator.

Electron induced reactive processing (EIReP)

- long chain branching of polymers
- toughened polymers
- compatibilization of polymer blends and composites

Curing and crosslinking of polymers

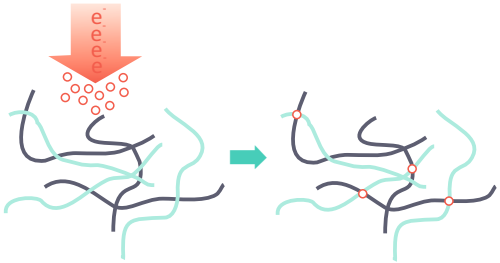
- curing of fibre reinforced thermosetting polymers
- crosslinking of fibre reinforced thermoplastic polymers
- crosslinking of rubbers
- crosslinking of thermoplastic polymers
- shape memory polymers

Functionalization of polymers

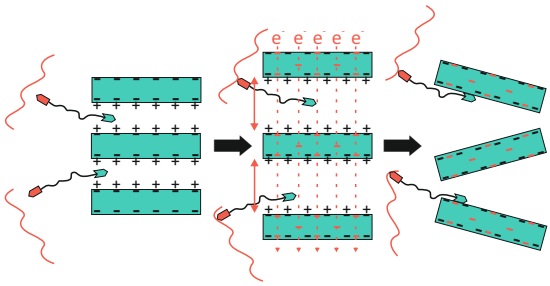
- PTFE for reduction of friction and wear
- self nucleation of PP, PHB and PLA
- ETFE for production of proton exchange membranes for fuel cells
- surface functionalization by polymer brushes
- surface functionalization of hollow fibres

Development and production of multifunctional polymers

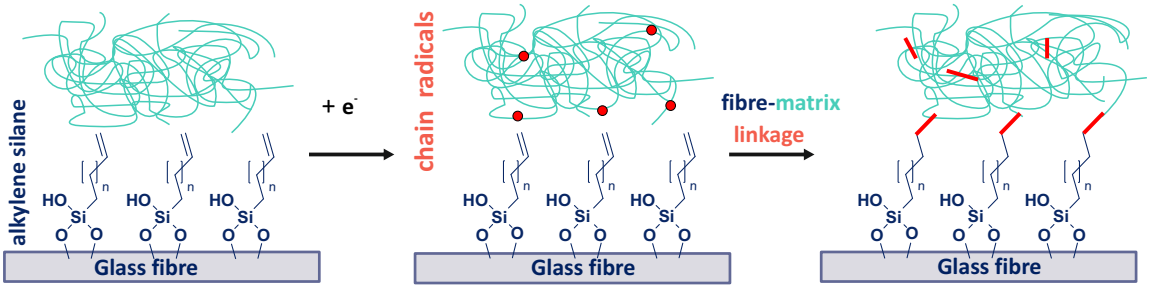
- flame retardant polymers
- short and long fibre reinforced polymers
- natural fibre reinforced biopolymers



Electron-induced branching and crosslinking



Electron-induced Clay Intercalation



Electron-induced fibre- matrix- linkage

Laboratory electron beam modification

Electron accelerators

parameters	high-energy-accelerator	low-energy-accelerator	
electron energy	0.6 - 1.5 MeV	80 - 150 keV	80 - 300 keV
electron current	< 4 mA	< 0.16 mA	< 10 mA
working width	8 - 100 cm	0.8 cm	20 cm
manufacturer	BINP	ELECTRON CROSSLINKING AB	COMET AG

Conveyor system for component parts and pellets

- maximum speed: 12 m/min
- maximum sample size: 1 m x 2 m

Robot controlled edge modification of component parts

- size of parts: 1 m x 3 m
- gas atmosphere: air

Monitoring

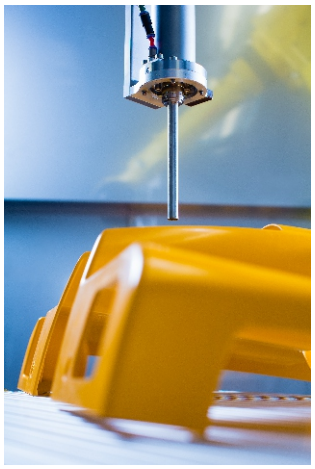
- EPR-spectroscopy
- TAU2-NMR-spectroscopy

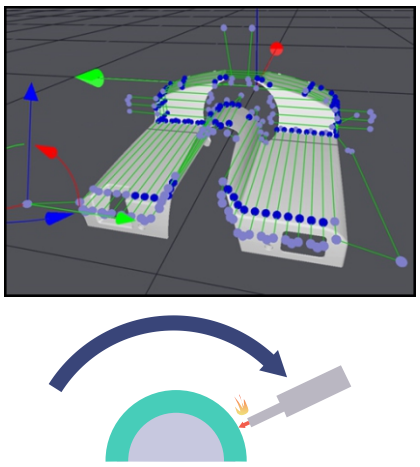
High temperature treatment

- maximum sample size: 0.2 m x 0.2 m
- temperature: 25 ... 400 °C
- gas atmosphere: vacuum and special gases

Electron induced reactive processing of polymer compounds

- throughput: 2 ... 5 kg/h
- gas atmosphere: air and nitrogen





Robot controlled 3D edge- layer modification (photos: © J. Lösel)

Contact

Leibniz-Institut für Polymerforschung Dresden e. V.
Department Processing Technology

M. Eng. Carsten Zschech
E-Mail: zschech@ipfdd.de
T +49 (0)351 4658 233
F +49 (0)351 4658 362

Dr. Michael Thomas Müller
E-Mail: mueller-michael@ipfdd.de
T +49 (0)351 4658 323
F +49 (0)351 4658 362

Hohe Straße 6 . 01069 Dresden . Germany
www.ipfdd.de

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