

of fluoropolymer yielded significant changes in the properties of the materials tested. A superhydrophobic surface of fibres is formed, which affects the resistance against destructive, external factors. Mechanical properties of the PACVD-modified ballistic textiles showed prolonged stability of the performance and safety features during the simulated accelerated aging test when the temperature as well as temperature and relatively high humidity were applied.

Based on the results obtained, it can be concluded that PACVD followed by deposition of fluoropolymer onto the surface of p-aramid ballistic textiles is a promising, economical and environmental-friendly technique that allows to prolong the usage of ballistic protectors.

Verification of the ballistic properties of un- and PACVD-modified p-aramid woven fabrics according to the PN-V-87000 Standard for the initial materials as well as after accelerated aging will be the next stage of the research. Additionally the effect of potential changes in the structural

properties after the accelerated aging test will also be studied.



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## INSTITUTE OF BIOPOLYMERS AND CHEMICAL FIBRES

### Team of Synthetic Fibres

The team conducts R&D in melt spinning of synthetic fibres

#### Main research Fields:

- processing of thermoplastic polymers to fibres:
  - classic LOY spinning:
    - fibres of round and profiled cross-section and hollow fibres
    - special fibres including bioactive and biodegradable fibres
    - technical fibres, eg. hollow fibres for gas separation, filling fibres for concrete
  - bicomponent fibres:
    - side-to-side (s/s) type self-crimping and self-splitting
    - core/sheath (c/s) type
- processing of thermoplastic polymers to nonwovens, monofilaments, bands and other fibrous materials directly spun from the polymer melt,
- assessment of fibre-forming properties of thermoplastic polymers including testing of filterability

#### Equipment:

Pilot-scale equipment for conducting investigations in melt spinning of fibres :

- spinning frames for:
  - continuous fibres of 15-250 dtex,
  - bicomponent continuous fibres of 20 – 200 dtex)
- drawing frames for continuous filament of 15 – 2000 dtex
- laboratory stand for spun bonded nonwoven 30 cm width
- laboratory stand for investigations in the field of staple fibres (crimping, cutting line)
- laboratory injection molding machine with a maximum injection volume of 128 cm<sup>3</sup>
- testing devices (Dynisco LMI 4003 plastometer, Brabender Plasticorder PLE 330 with laboratory film extrusion device)
- monofilament line for monofilaments of 0.3 – 1 mm diameter

#### Implemented technologies (since 2000):

- texturized polyamide fibres modified with amber for preparation of special antirheumatic products
- polyolefin hollow fibres for gas separation
- bioactive polypropylene POY fibres
- modified polypropylene yarns
- polyolefin fibres manufactured from PP/PE wastes

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