MAPEX Bremen
Material. Process. Excellence.

10
06-2019

INSTRUMENT DATABASE
POLYMERS, FIBRES, TEXTILES AND FIBRE COMPOSITES

Universität Bremen

II LABORATORY EQUIPMENT, FASERINSTITUT BREMEN E.V.

FASERINSTITUT FIBRE BREMEN

The characterisation of polymers, fibres, textile products, and fibre composites is essential for their processing as well as for the development of new materials and products. The laboratory of the Faserinstitut, which has been certified according to DIN EN ISO/IEC 17025 since 2002, has appropriate methods at its disposal. In addition to physical-technical and mechanical tests, thermal, chemical and microscopic test methods are performed.

The thermal and thermo-mechanical properties, such as glass transition, melting range and viscosity, are used, e.g. for setting the parameters for processing of polymers into fibres and composites. The Faserinstitut carries out the mechanical test procedures from the single fibre to the yarn and textile as well as for fibre composite materials. Depending on the sample, a wide variety of testing instruments are used. The imaging methods mainly serve to evaluate the internal quality and the fracture surfaces of composite materials as well as to analyse the topology and structure of fibres.

A detailed overview of the equipment at the Faserinstitut is shown on the next page.

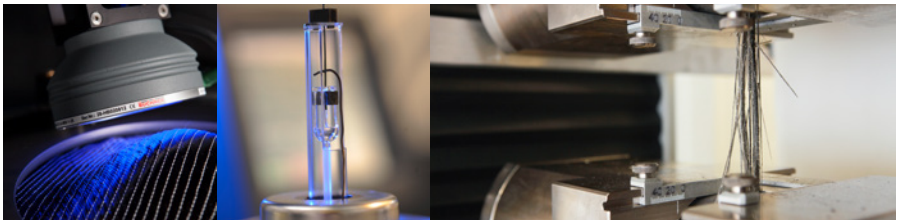

Fig.1 (left): Determination of draping properties (Textechno DRAPTEST)
Fig. 2 (middle): Determination of the coefficient of thermal expansion of a carbon fibre roving, TMA – Thermo Mechanical Analysis (TA Waters, Q 400)
Fig. 3 (right): Tensile test on CFRP, universal testing machine (Zwick, Z250)

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01 II Thermal Analysis

- DSC – Differential Scanning Calorimetry (TA Waters, Q 1000)
- DMA – Dynamical Mechanical Analysis (TA Waters, Q 800, Fig. 4)
- TMA – Thermo Mechanical Analysis (TA Waters, Q 400)
- Rheometer (TA Waters, AR2000ex)
- Laser Flash (Netzsch, LFA 457 MicroFlash®)
- Thermogravimetric analyzer (Eltra Elemental Analyzers, TGA Thermostep)
- Thermal conductivity instrument (Taurus Instruments, TLP 500P)

02 II Mechanical Test Methods

- Universal testing machine (Zwick, Z250, Fig. 3)
- Universal testing machine (INSTRON, 4502)
- Dynamic testing machine (INSTRON, ElectroPuls™ E10000)
- Pendulum Impact Test, Thwing-Alber Frank
- Notched Impact Test (Roell)
- Creep Test Machine
- Single fibre strength (Dia-Stron, LEX820)

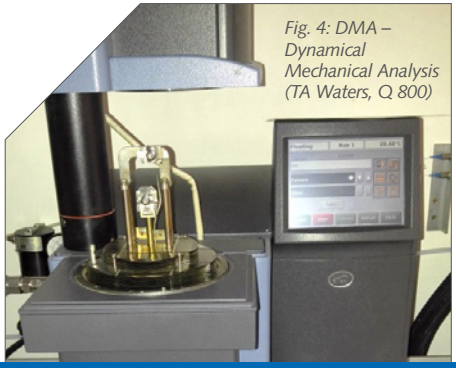

Fig. 4: DMA – Dynamical Mechanical Analysis (TA Waters, Q 800)

- Single fibre strength (Textechno, FAVIMAT+)
- Yarn tensile test (Textechno, STATIMAT)
- Fibre matrix adhesion, pull-out (Textechno, FIMATEST and FAVIMAT+)

03 II Imaging Methods

- Preparation of microsections (Struers, Knuth-Rotor 2)
- Light microscopy (Zeiss, Axioplan, Axioskop 2 plus, Makroskop)
- Scanning Electron Microscopy (Zeiss, EVO MA 10)
- µ-Computer tomography (Phoenix-x-ray vltomelx m (research edition), see Instrument 05, 12 - 2017)

04 II Chemical Processes/Other/ Further Equipment

- Drapetest (Textechno, DRAPTEST, Fig. 1)
- Extraction equipment (e.g. for fibre volume determination)
- Test equipment for qualitative and quantitative fibre analysis
- Fire chamber for horizontal and vertical flame-tests
- Climatic chamber (VÖTSCH, VC 0018)

05 II Contact

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