



# CONTINUOUS GLASS FIBRE SPINNING Fibre sizing, Interphase and Composite properties

The demand on new fibre surface as well as interphase concepts for advanced composites increases. Moreover, its fundamental understanding is required in order to exploit the full potential of composites. The Leibniz-Institut für Polymerforschung Dresden e.V. (IPF) is equipped with a pilot plant which allows the manufacture of continuous glass filament yarns and the application of sizings of various compositions.

### **Glass Fibre Spinning Process**



# **Fibre sizings**

Aqueous sizings consist of various components, predominantly film formers, coupling agents and surfactants.

The sizing formulation affects the properties and interactions with the polymer matrix. Thus, sizings are important both for the role they carry out protecting the fibre surface during the fibre manufacture and for the effect they have on the properties of fibre reinforced composites.

## **Fields of work**

- Water-based sizings
- Fibre matrix adhesion
- Nanostructured surfaces
- Multifunctional interphases

#### Additives

Silane Coupling Agents

Polymeric Film formers



# Characterization of fibre, yarn and composite properties

Besides the mechanical testing of fibre reinforced thermoplastics or thermosets on macroscopic scale, micromechanical investigations by e.g. Single fibre pull-out test as well as the investigation of fibre and fracture surfaces reveal further insights into interphase properties and failure of composites.

#### **Testing methods**









Single fibre pull-out test

Transverse tensile test

Scanning electron microscopy

# **Tailored interphases**

The performance of composite materials is strongly influenced by their interphases. A gradual characteristic of interphase properties is desirable. Our approach is to tailor interphase properties in order to achieve:

- Improved adhesion strength
- Improved durability
- Controlled morphology
- Multifunctional interphases



#### References

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