TU Dresden, Institute of Lightweight Engineering and Polymer Technology

Specialist group for special materials and special processes

About this organisation

Machine translation

This organisation has been machine-translated based on data provided in German.

At the Institute of Lightweight Engineering and Polymer Technology at TU Dresden, nine specialist groups focus on different areas of lightweight construction. The research focus of the Special Materials and Processes group is on metal matrix composites, ceramic matrix composites, magnetic hybrid materials, customised fibre functionalisation and generative manufacturing processes, such as continuous fibre-reinforced 3D printing.

The high customisability of additive processes paired with conventional technologies, the performance of fibre-reinforced materials, the adaptability of bionic structures, the good-natured failure behaviour of metallic materials and the thermal resistance of ceramics are constantly opening up new fields of application and unimagined potential. This deliberate fusion of technologies and material characteristics is the key expertise of the Special Materials and Special Processes Group at the Institute of Lightweight Engineering and Polymer Technology. The aim of the specialist group is the targeted further development and research of innovative hybrid manufacturing processes and highly resilient mixed composites to establish "generative multi-material lightweight construction" as an internationally leading technology for multi-layer composite structures with stress-appropriate 3D fibre reinforcement.

Institut für Leichtbau und Kunststofftechnik

Organisation type
University or higher education institution

Sectors

Employees
Up to 9

Turnover
Up to €2m

Funding
n/a

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01307 Dresden
Saxony
Germany
tu-dresden.de/ing/maschinenwesen/ilk/forschung/fachgruppe-sonderwerkstoffe-und-verfahren




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Main areas covered	Multi-material lightweight construction, High-temperature materials, Magnetic hybrid materials, Tailor-made carbon fibres, Generative manufacturing
Infrastructure	Generative manufacturing innovation lab, CVD system for fibre coating, LT, HT, HTT carbonisation systems, High-temperature ovens
Certifications	
Keywords	3D printing, Multi-material lightweight construction, Smart materials, Generative manufacturing, Hybrid structures
Memberships	

Overview of lightweighting expertise

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	Research	Development	Manufacturing & Supply
Offer			
Products Parts and components, Semi-finished parts, Materials, Tools and moulds	✓	✓	
Services & consulting Training, Consulting, Testing and trials, Funding, Engineering, Standardisation, Prototyping, Technology transfer	✓	✓	

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	Research	Development	Manufacturing & Supply
Field of technology			
Design & layout Lightweight manufacturing, Lightweight design, Hybrid structures, Lightweight construction concepts, Lightweight material construction	✓	✓	
Functional integration Thermal activation, Material functionalisation	✓	✓	
Measuring and testing technology Component and part analysis, Visual analysis (e.g. microscopy, metallography), Materials analysis, Non-destructive analysis	✓	✓	
Modelling and simulation Materials	✓	✓	
Plant construction & automation Plant construction, Handling technology	✓	✓	
Recycling technologies			

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	Research	Development	Manufacturing & Supply
Manufacturing process			
Additive manufacturing 3D printing, Selective laser sintering (SLS)	✓	✓	
Coating (surface engineering) Others (CVD coating)	✓	✓	
Fibre composite technology Vacuum infusion	✓	✓	
Forming			
Joining			
Material property alteration Thermomechanical treatment, Heat treatment	✓	✓	
Primary forming Others (Pyrolysis of ceramic composites, gas pressure infiltration)	✓	✓	
Processing and separating			
Textile technology Fibre manufacturing, Preforming, Textile surface treatment and finishing	✓	✓	

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	Research	Development	Manufacturing & Supply
Material			
Biogenic materials Bioplastics, Biocomposites, Wood	✓	✓	
Cellular materials (foam materials) Open-pore	✓	✓	
Composites Aramid fibre composites, Basalt fibre-reinforced plastic, Glass-fiber reinforced plastics (GFRP), Ceramic matrix composite (CMC), Carbon-fiber reinforced plastics (CFRP), Metal-fibre-polymer composite, Metal-ceramic composite, Metal matrix composite, Natural fibre reinforced plastics (NFRP), Textile-reinforced concrete	✓	✓	
Fibres Aramid fibres, Basalt fibres, Glass fibres, Ceramic fibres, Carbon fibres, Metal fibres, Natural fibres	✓	✓	
Functional materials Electrorheological/magnetorheological fluids	✓	✓	
Metals Aluminium, Intermetallic alloys, Magnesium, Steel, Titanium	✓	✓	
Plastics Thermoset plastics, Elastomers, Thermoplastics	✓	✓	
Structural ceramics Monolithic ceramics, Non-oxidic ceramics, Oxidic ceramics	✓	✓	
(Technical) textiles Yarns, rovings, Meshes, Laid webs, Crocheted fabrics, Woven fabrics, Knitted fabrics, Nonwovens, mats	✓	✓	

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Contacts

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Employees special materials and processes

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