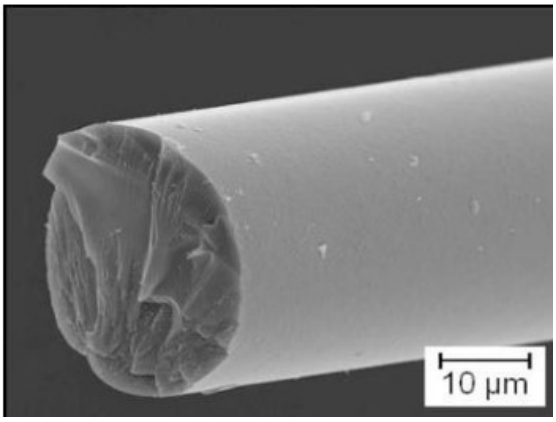
Chair of Ceramic Materials Engineering @ University of Bayreuth

Die Uni Bayreuth forscht in verschiedenen Bereichen zu CMC und CFK.

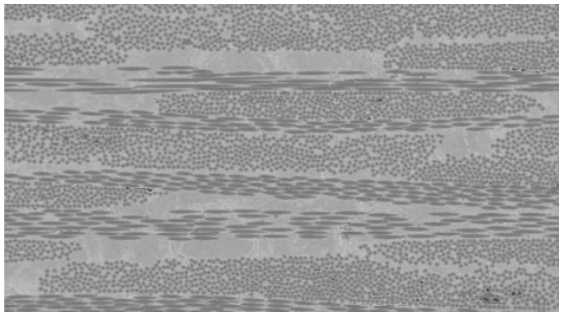
The Chair focuses on education and basic research of functional and structural ceramic materials and has approximately thirty years of experience in synthesis, process and material developments and characterization of CMCs and polymer derived ceramics (PDC). Three research groups with about 30 scientists and technicians are supported by about 20 students. Investigated topics cover PDC-derived fibers and coatings as well as non-oxide (C/C-SiC, SiC/SiC) and oxide CMCs. Engineering aspects of CMCs from processing to prototype manufacturing and testing as well as the transfer of research results with industrial partners are a second focus of research activities.



SiCN-Monofilament @ CME

Manufacturing and processing methods available include for example:

- Fiber production, coating, and thermal treatment
- Preform technology like fiber spinning, robot assisted short fiberspraying, winding, additive manufacturing and laminate technology
- Slurry based technology
- PIP/LPI
- Sintering
- LSI/RMI



Microstructure of oxide composite ceramic with Al2O3 fiber reinforcement @ CME

The fibers, coatings, hybrid materials and CMC components with possible prototype dimensions of up to 40 cm diameter are tested, modelled and evaluated with extensive characterization facilities. These facilities also include the capabilities to assess raw materials, simulate process steps, determine process

and material parameters and finally to analyze the thermo-mechanical and application-oriented properties of the components. Hence, analysis methods and devices cover spectroscopy (FTIR, Raman, MS), TG-DSC, rheometry, particle analysis (size, shape, Zeta potential), dilatometry, SEM with EDX and EBSD, mechanical testing with loads up to 50 kN at room temperature and up to 1550 °C, tribological characterization from small scale tribometer up to full scale brake test rig as well as wetting behavior, layer adhesion, surface analysis and non-destructive testing methods (IET).

Brake test bench in cooperation with the Chair of CAD @ CME