

Institute for Manufacturing Technologies of Ceramic Components and Composites

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Working Group 2: « **Manufacturing and characterization of 3D-porous scaffolds** »

Staff:

Dr.rer.nat. Frank Kern - Head of department High Performance Ceramics

PD Dr.rer.nat. Andreas Killinger - Head of Department Surface Technologies and Composites

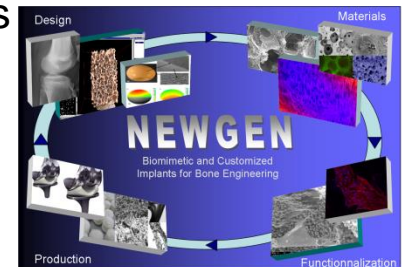
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Research topics: Bulk and Surface Structures for Biomedical Applications

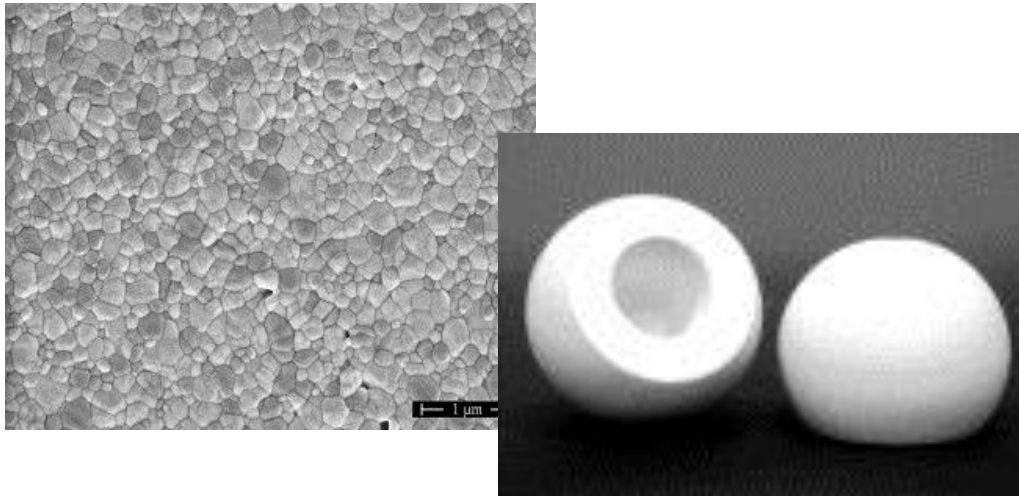
IFKB

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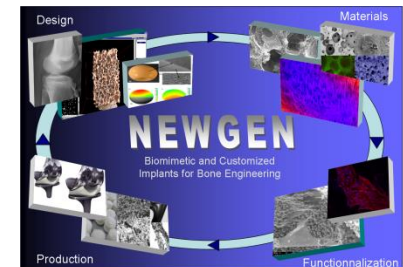
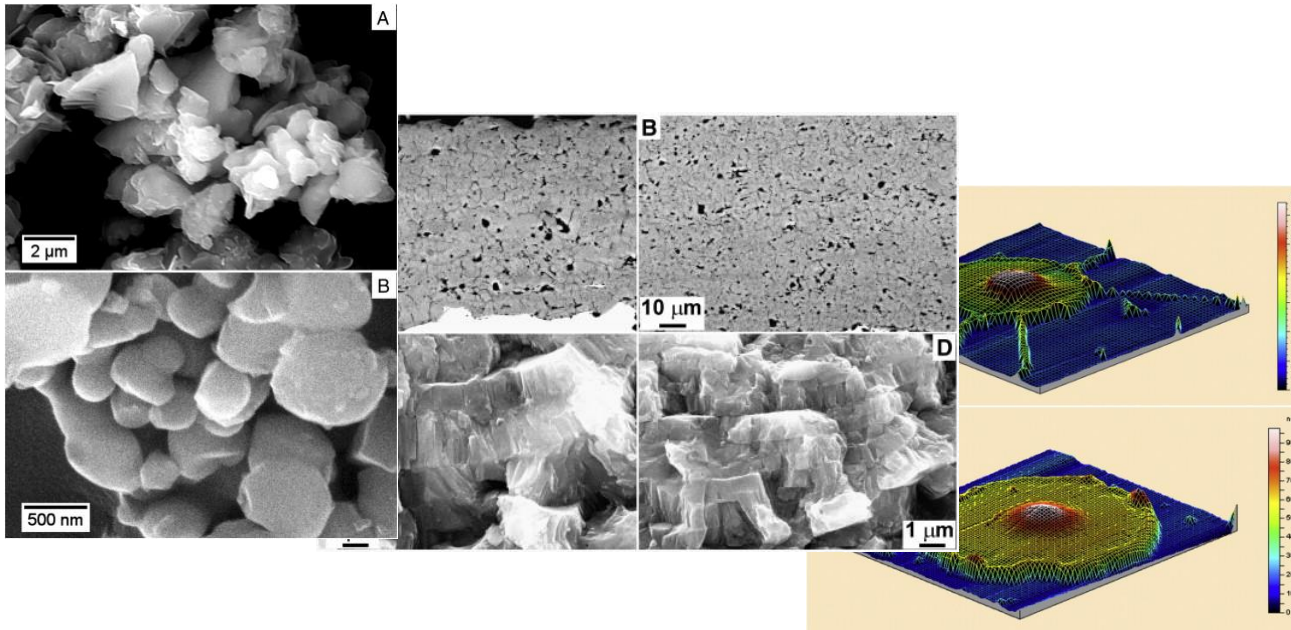
COST Action MP1301

- ✓ Coating and stabilization of Zirconia with rare earth oxides
 - ✓ Zirconia – Alumina bulk components: ATZ, ZTA
 - ✓ Injection molding of ceramic components for biomedical implants

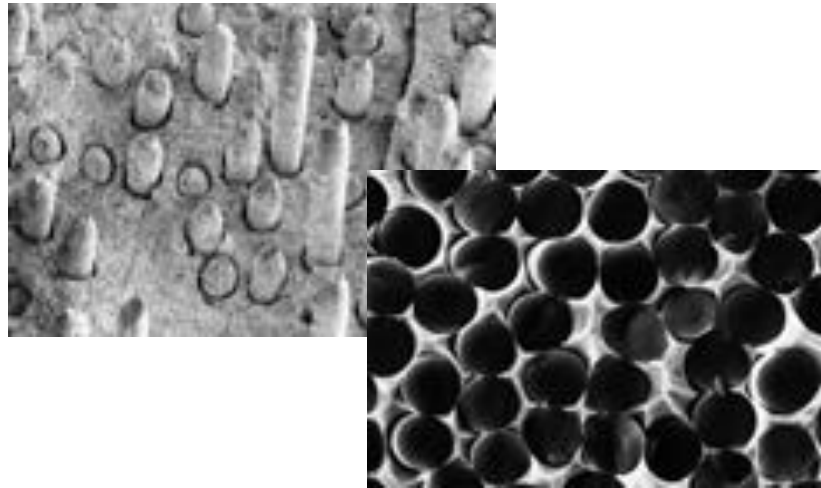


Optimization of process parameters for the development and characterization of biomedical coatings:

- hydroxyapatite
 - calcium phosphates
 - bioglasses

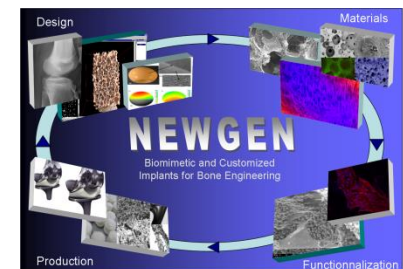


- ✓ Alternative Reinforcement Materials
- ✓ Fiber Coating
- ✓ Functionalization of composites

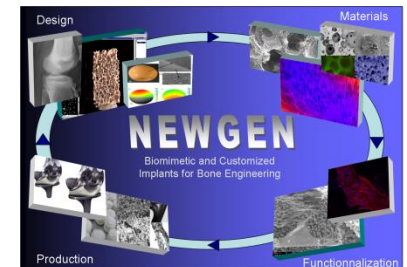


Manufacturing Technologies:

Resin Transfer Moulding (RTM, VaRTM)
High Pressure RTM
Vacuum Infusion (VARI)
Warm pressing
SMC
Polymer Infiltration and Pyrolysis (PIP)
Liquid Phase Siliconizing
Filament-Wet-Winding
Fiber preforming / Handling



- Rapid Prototyping 3D Printer
- Hydraulic Press 100 t; cold dry and warm pressure molding
- Injection Molding Machine
- Spray dryer
- Extruder



Three spray cabinets with 6 axis industrial robots. System TopGun™; fuelled with acetylene, ethene, propane, hydrogen and kerosene. Diverse DC based single cathode torches (GTV F1, F4, F6);

Thermal spraying of suspensions:

- ❖ **Suspension Plasma Spraying (SPS).**
- ❖ **High Velocity Suspension Flame Spraying (HVSFS)**

Thermal spraying of powders:

- ❖ **Atmospheric Plasma Spraying (APS)**
- ❖ **High Velocity Oxygen Fuel Spraying (HVOF)**

- Hg-Porosimeter
- BET-Porosimeter
- Particle size analyzer Mastersizer 3000
- Zeta Potential measurements Zetasizer Nano ZS
- White Light Interferometer – Topography Characterization
- Dynamic Micro Hardness Measurements HV0,1 - HV10 also used for toughness measuring
- Impedance spectroscopy / electrochemical workstation
- Wetting angle and surface energy measurements
- Thermal analysis; DSC, DTA, TG
- Dilatometer

- Light microscopy, polarised light microscopy
- Universal testing machine Zwick Z100/TL3A

