

Physical Characterization of Ceramic Powders, Processing Systems, Green Bodies and Bulk Materials

The behavior of ceramic semi-finished bodies, bulk materials and components in use depends mainly upon

- the physical characteristics of the original powder, e.g. its active powder surface or particle-size distribution (Figure 1)
- the processability (pressing or extrusion behavior, castability, etc.) of the granules, mixtures, pastes and slurries (Figure 2)
- the drying and sintering behavior of the green bodies
- the properties of the semi-finished bodies (Figure 3) and final components

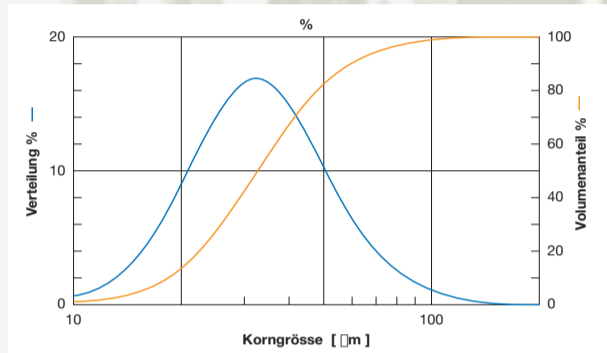
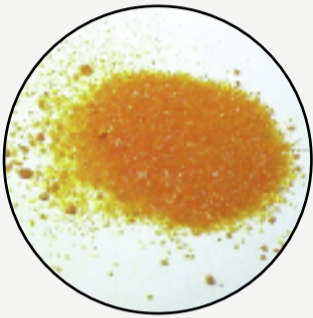


Figure 1

Powder characterization

The average diameter d_{50} is approx. 30 μm , as determined by laser granulometry.

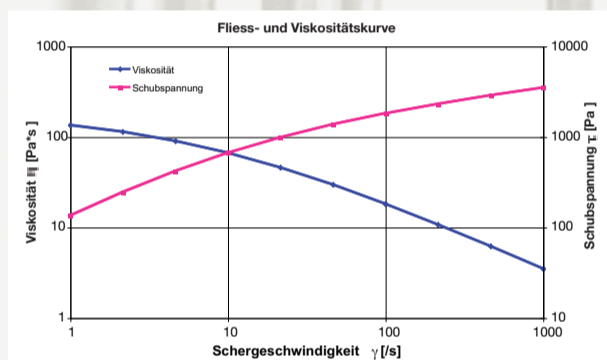


Figure 2

Rheological behavior of a slurry

Flow and viscosity curves of an Al_2O_3 -slurry with 80 wt% solids loading, showing shear-thinning behavior.

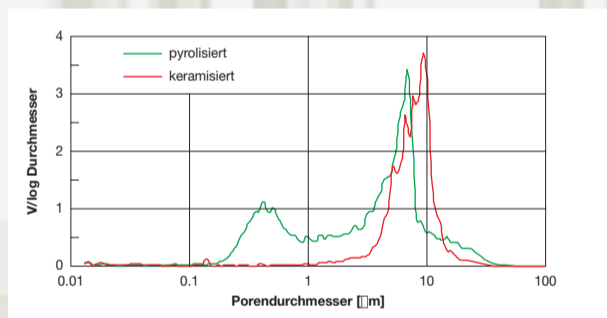
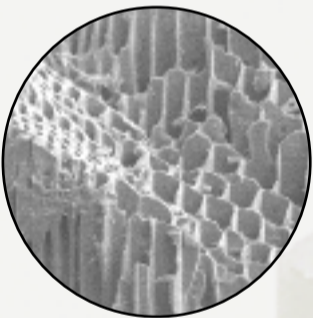


Figure 3

Biomimetics

Pore-size distribution in ceramized pine after SiO_2 -infiltration at 1800°C/4h, 70 vol% porosity. Potential applications: filters, catalysis substrates.

Our services

Powder	Specific gravity Specific surface area Particle size and size distribution Particle shape	Helium pycnometer BET Sieve tower, laser granulometer, PCS Light and electron microscopes
Processing systems	Slurries Pastes (rheology)	Rotation viscometer, zetameter Torque rheometer, capillary rheometer
Green bodies, bulk materials and components	Specific gravity Specific surface area Grain size and shape Pore size and size distribution Pore shape Elemental distribution	Archimedes' Principle, helium-pycnometer BET Light and electron microscopes Mercury intrusion porosimeter Light and electron microscopes Element mapping

Further possibilities and a list of our accredited procedures are available on request

Your benefits

- Professional physical characterization of ceramic powders, processing systems, green bodies and bulk materials
- Development, validation, testing, evaluation and analyses by a qualified partner

Your contact

Thomas Graule, Dr. rer. nat
Telefon +41 44 823 41 23
e-mail: thomas.graule@empa.ch