

Characterization methods

Mechanical materials testing

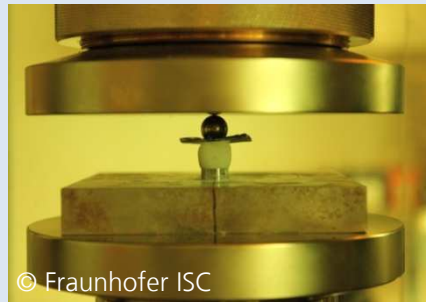
Test conditions

- Sample preparation and sample storage/measurement in an air-conditioned laboratory under defined conditions

Standard test methods

Universal testing machine Z100 (Zwick) equipped with 100 N, 5 kN, 20 kN, 100 kN load cell

- Flexural strength, compressive strength and (micro)tensile strength, Young's modulus, fracture toughness
- (Compressive-)shear strength/
model system for tooth bonding
- In-situ compressive force for CAD/CAM milled dental crowns



Special test methods

- 3-body abrasion (ACTA)
 - Defined abrasion medium
 - Up to 200,000 stress cycles
 - Digital profilometer
- Chewing simulation
 - 8 sample chambers (ø 90 mm)
 - Depth/height of chewing 0 – 20 mm
 - Load per chamber up to 100 N, with 4 chambers up to 250 N
 - Thermocycling optional
 - Integrated wear measurement
- Dynamic-mechanical analysis
- (Micro)hardness



Damage analysis/Interface analysis
Other test set-ups on demand/customer focused

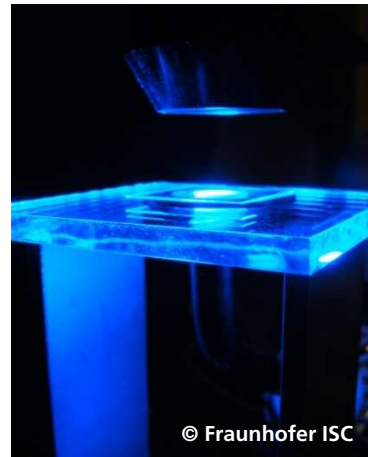
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Characterization methods

Chemical analytics/Polymerization tests

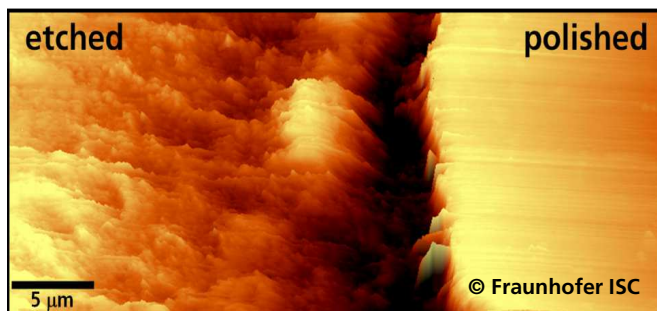
- Spectroscopic methods: μ -Raman, IR, multi nuclei NMR, UV-VIS
- Chromatography: HPLC, GPC, GC
- Various titration methods
- Polymerization tests
 - In-situ temperature curve during curing
 - Degree of conversion (Photo-DSC, Raman, IR)
 - Shrinkage (in-situ, classic)



Polymerization shrinkage according to Watts

Further methods

- Rheometer: viscosity/flow behavior
- Spectral photometer: color and translucency measurement
- Dilatometer: coefficient of thermal expansion
- Interface and roughness measurements:
 - 3D-Laserscanning microscopy
 - AFM
 - Contact angle measurement/penetration characteristics in porous structure



AFM image: enamel etching pattern by means of self-etching adhesives

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