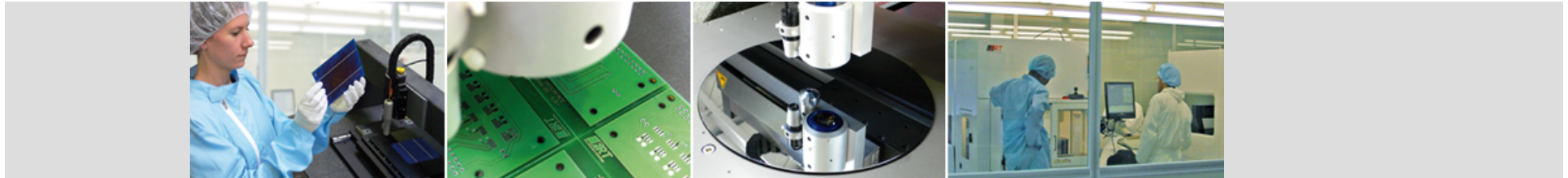


Interdisziplinäres wissenschaftlich-technisches Netzwerk für Analytische Tribologie (NWAT)

Bad Sachsa, 16.-17. Februar 2016



FRT, Fries Research & Technology GmbH
Dr. Jürgen Koglin

NWAT

Bad Sachsa, 16.-17. Februar 2016



- Gegründet 1995
- Niederlassungen in US und China
- Vertriebs- und Service-Partner in Asien und Europa
- Mehr als 600 Metrologie-Geräte weltweit



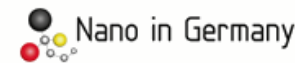
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Optische 3D Oberflächenmessgeräte:

- Topographie, Schichtdicke etc.
- Multi-Sensor Geräte
- Sensor-Entwicklung
- Entwicklung der Steuer- und Analyse-Software
- Integration und Automatisierung
- Dienstleistungsmessungen



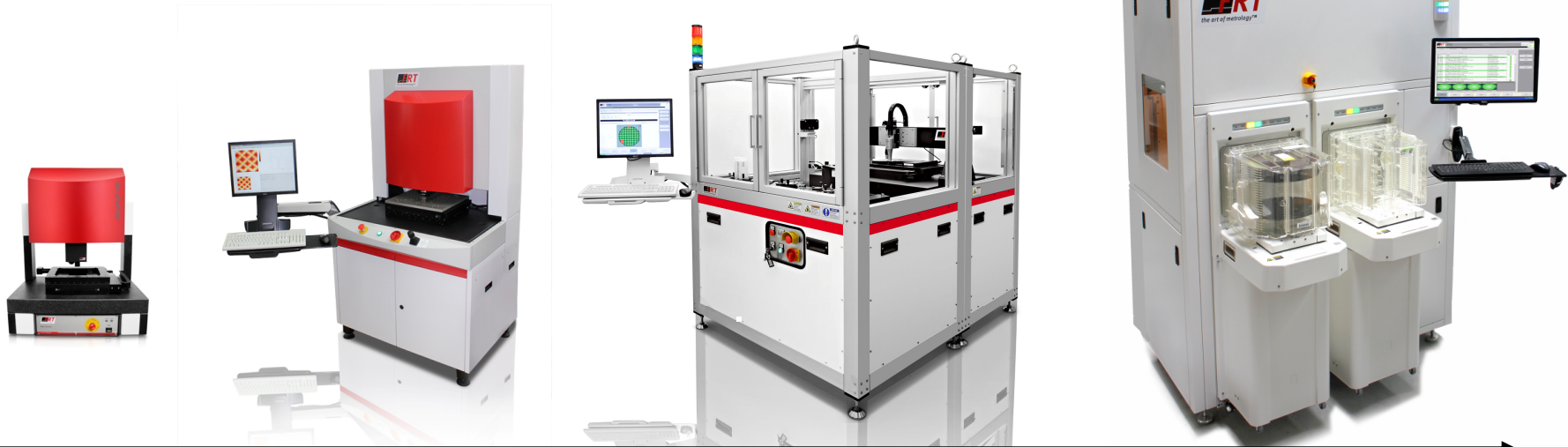
- Mitglied in verschiedenen Vereinen und Verbänden
- Mitglied in Normungsausschüssen

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- FRT MicroProf®



Tabletop Unit

Fully Integrated Production Tool

■ Branchen und typische Messaufgaben

- Topographie
- Rauheit
- Welligkeit
- Ebenheit
- Koplanarität
- Stufenhöhe
- Verschleiß
- Defekte
- Bow, Warp, TTV
(Total Thickness Variation)
- Schichtdicke

LED / Halbleiter / Mikroelektronik



Medizin- technik



Optik



Automotive



MEMS / Nano



Solar



■ Semi

- Front end
- Back end
- Mid end
- Micro electronics
- Nanotopography (NT)

■ MEMS / Micro structures

- Micro structures
- Conducting paths
- Micro fluidic
- MEMS wafer
- Thin films

■ Medical devices

- Implants
- Teeth
- Dental tools / Dental filling
- Tubes
- Needles
- Blood bags
- Bendable trocar
- Suction catheter

■ Automotive

- Interior
- Exterior
- Engines
- Batteries
- Brakes
- Cylinder head gaskets

■ Sapphire / LED

- Wafer thickness / flatness
- Roughness
- Saw marks
- Coating thickness
- Stress
- Wafer edge
- OLED

■ Solar

- Wafer thickness / Flatness
- Surface structure / Roughness
- Fingers / Bus bars
- Holes / Edges
- Coatings
- Thin film solar cells

■ Optics

- Lenses
- Lens arrays
- Fresnel lenses
- Intraocular lenses
- Free forms

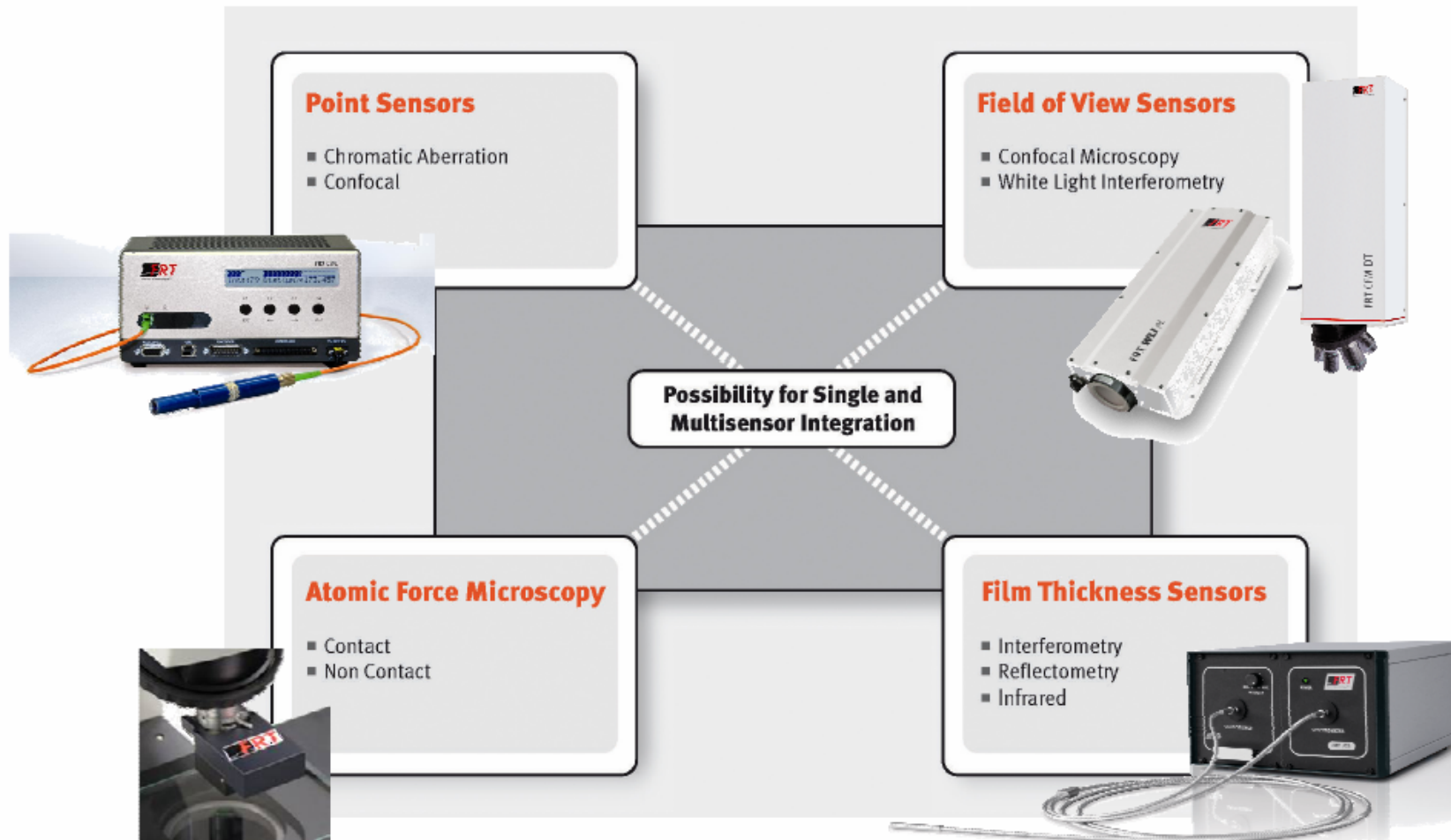
■ Engineering

- Valves
- Sealing
- Seat faces
- Pumps
- Defect inspection (scratches)
- Wear analysis

■ Packaging / Paper

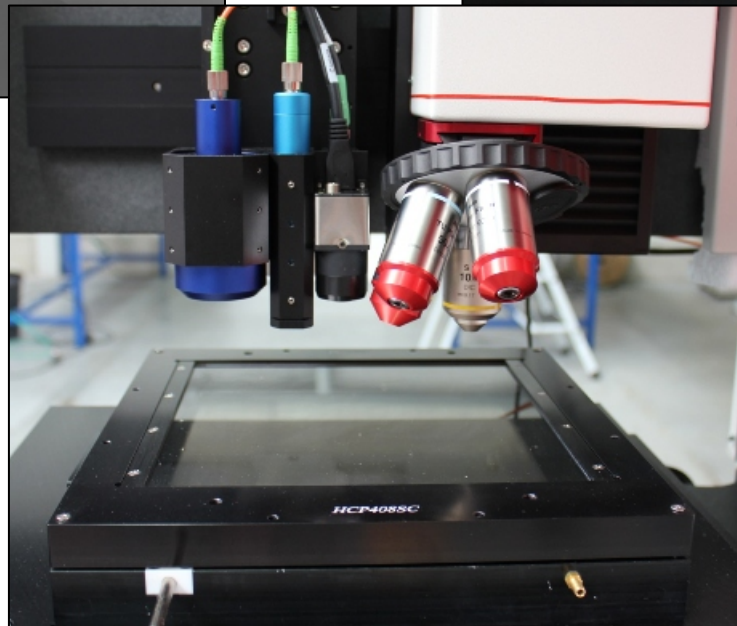
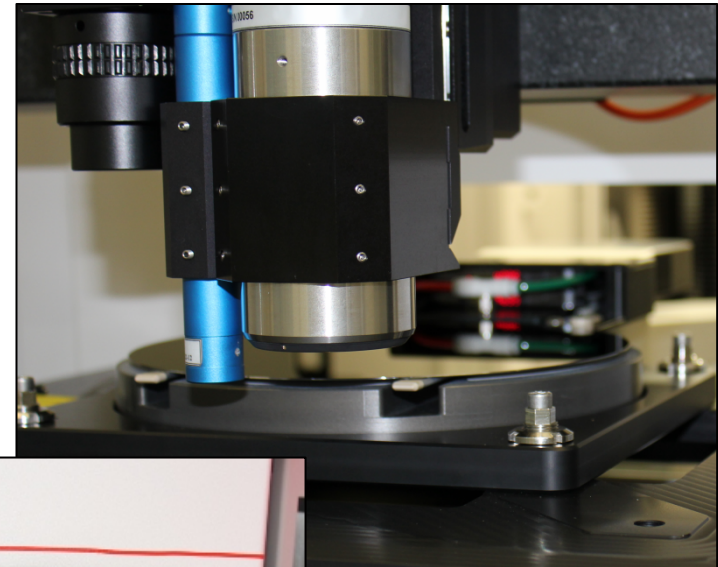
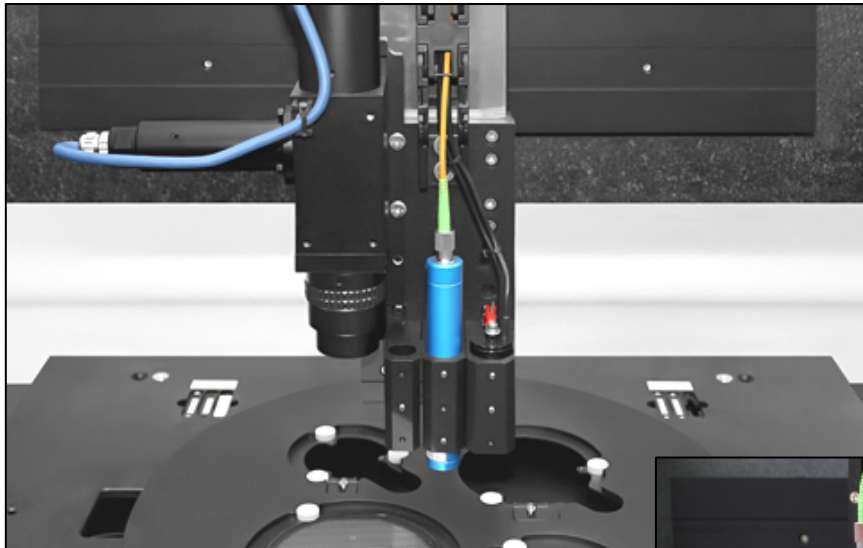
- Paper
- Textile
- Printing plates
- Printing rolls
- Painting
- Safety features

■ Sensoren



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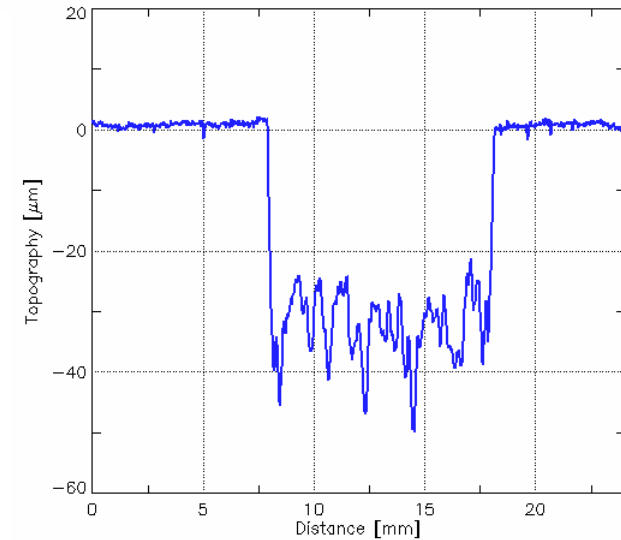
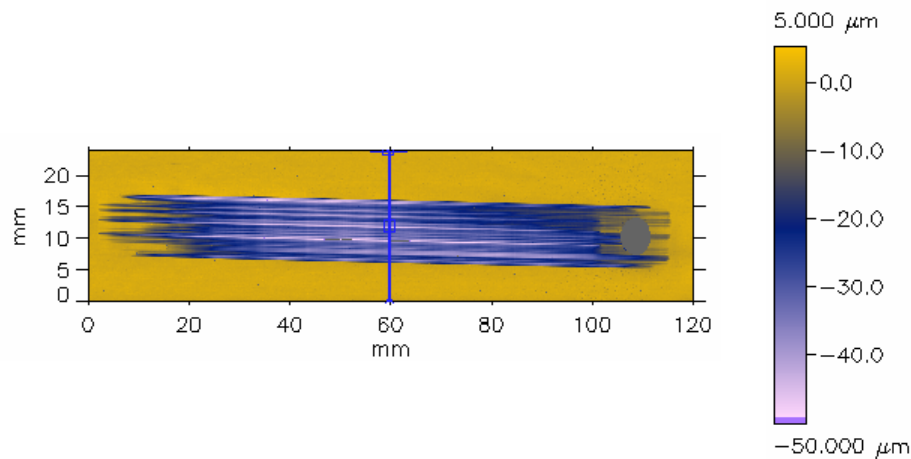
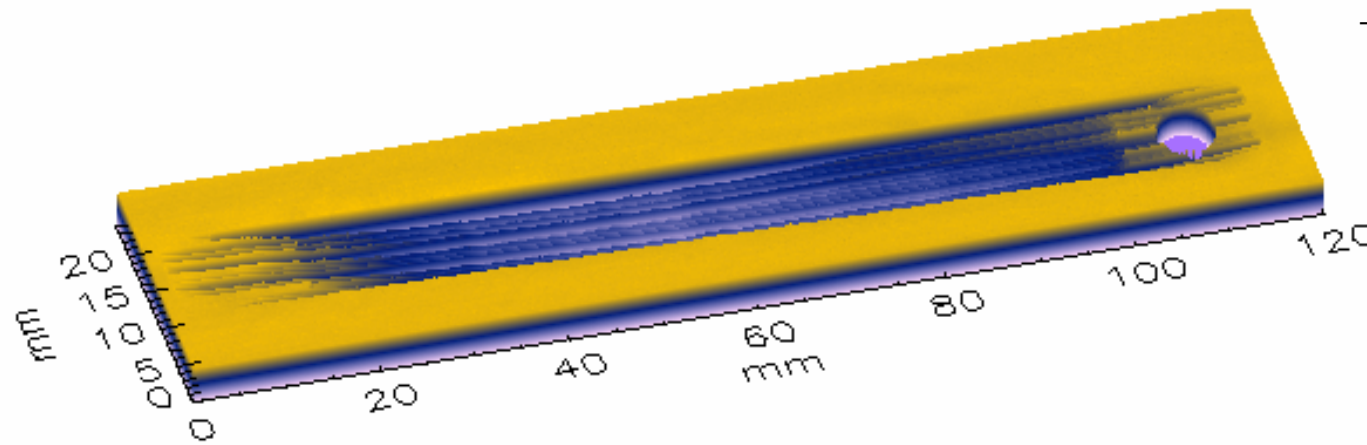


- **Multi-Sensor Konfigurationsbeispiele**

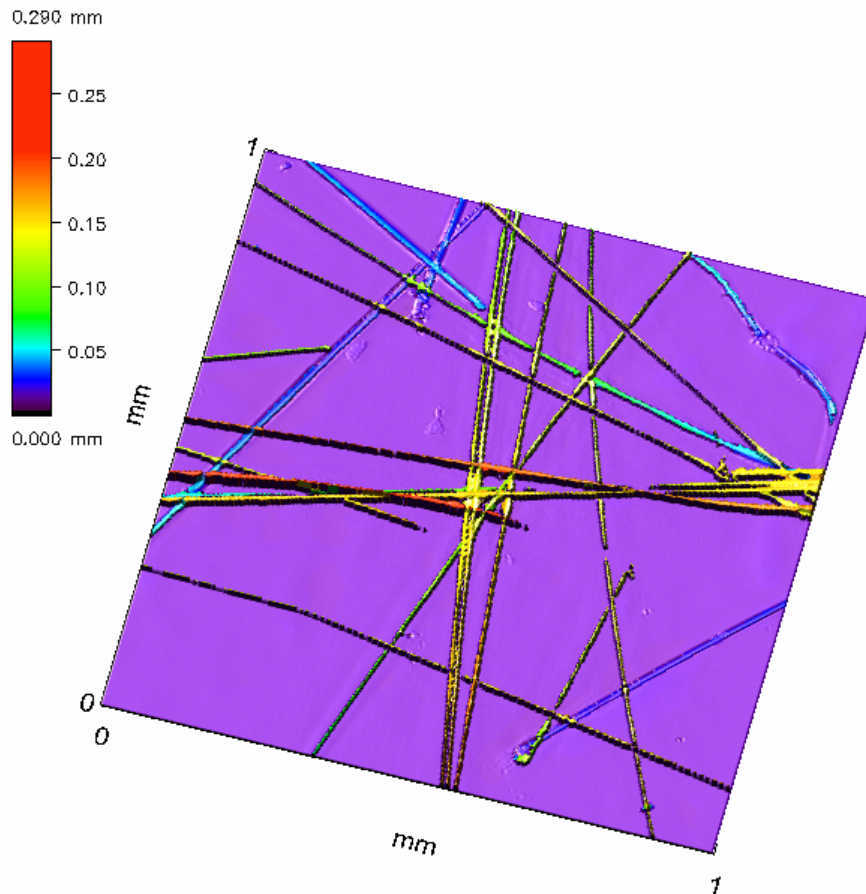
- Tribologie

Verschleißtest:

→ Volumen



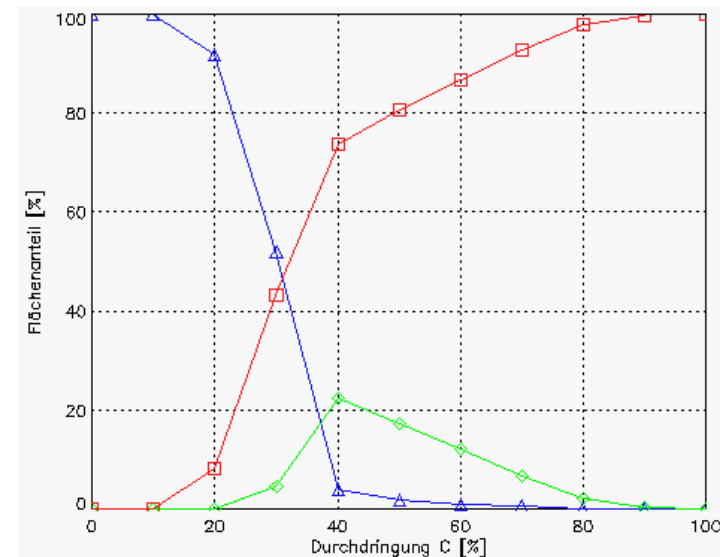
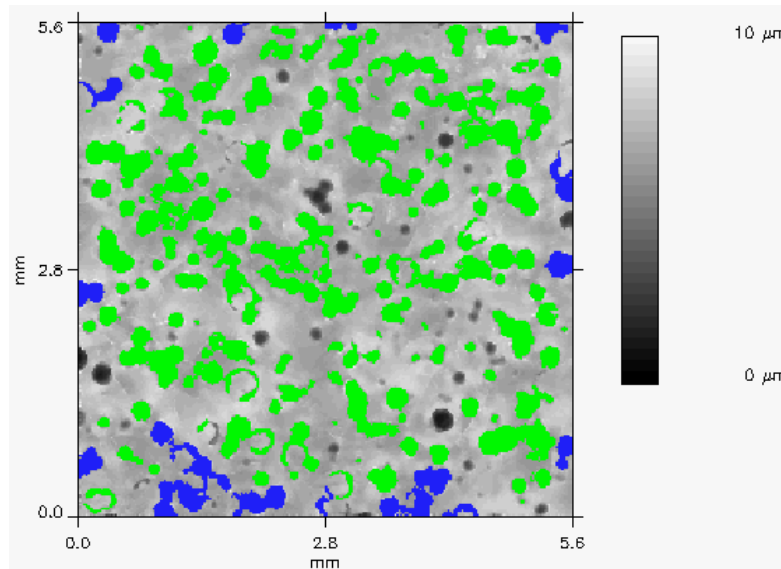
■ Tribologie



Compoundierung

→ inkorporierte Fasern und Partikel

■ Tribologie



Charakterisierung des tribologischen Verhaltens

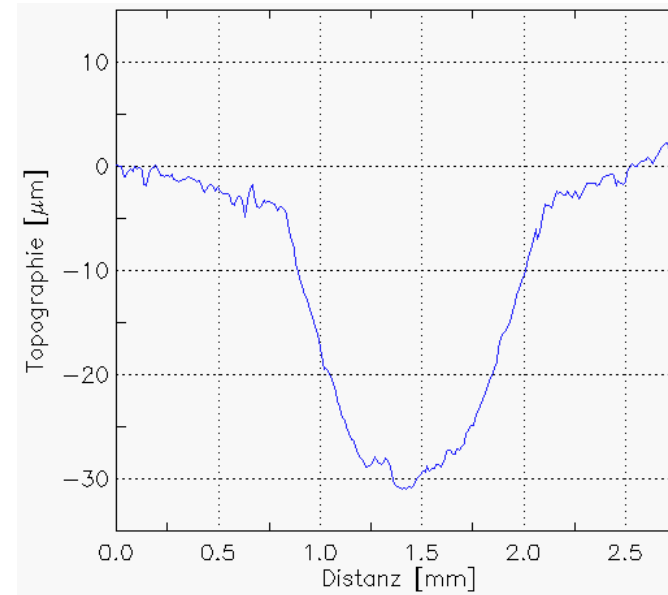
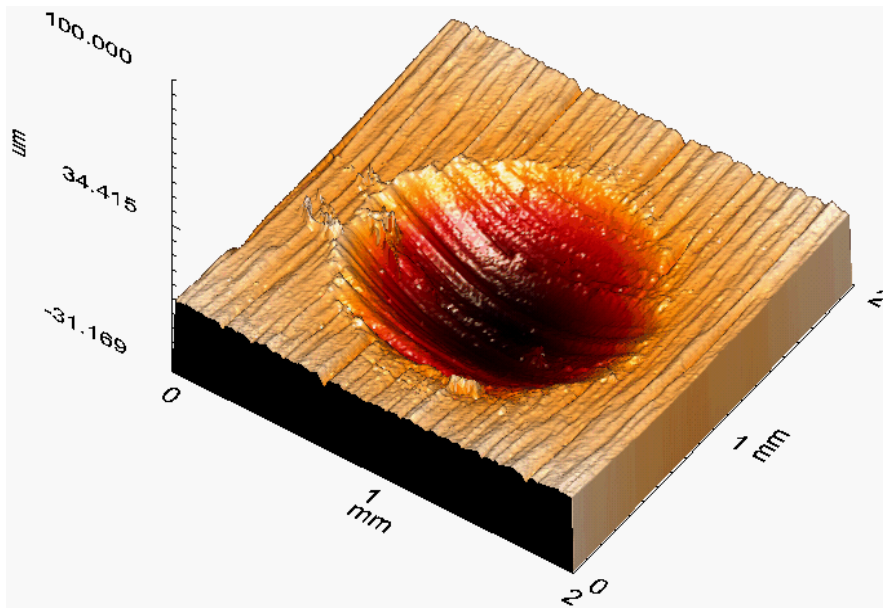
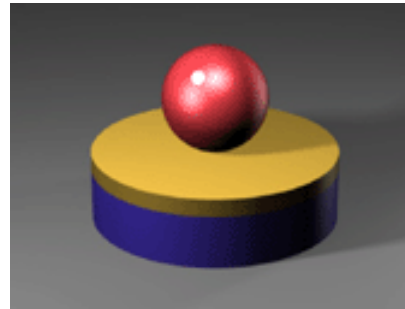
→ Analyse der offenen und geschlossenen Leerflächenanteile

Materialanteil (rot)
offene Leerflächenanteile (blau)
geschlossene Leerflächenanteile (grün)

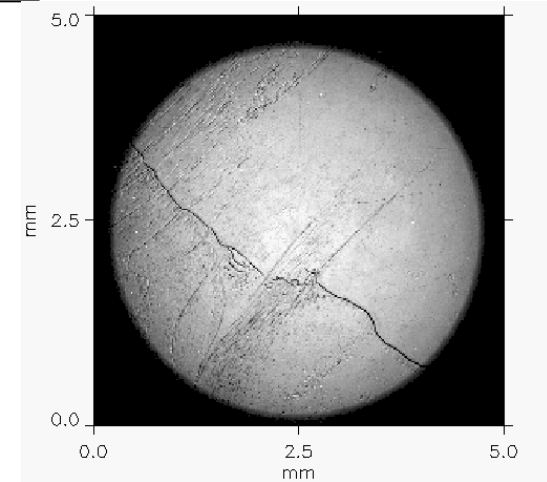
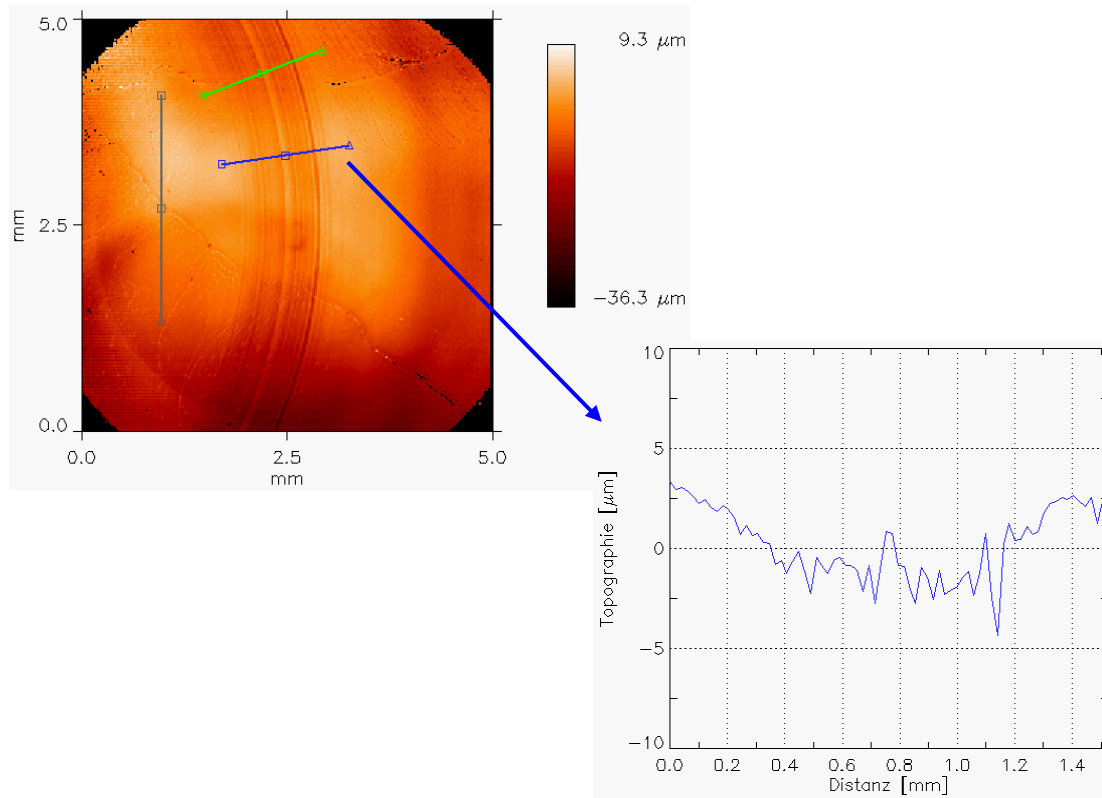
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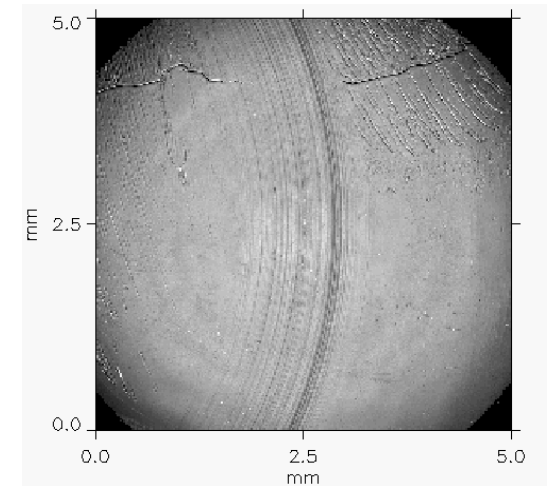
- Tribologie



■ Tribologie



Intensität: Kratzspuren



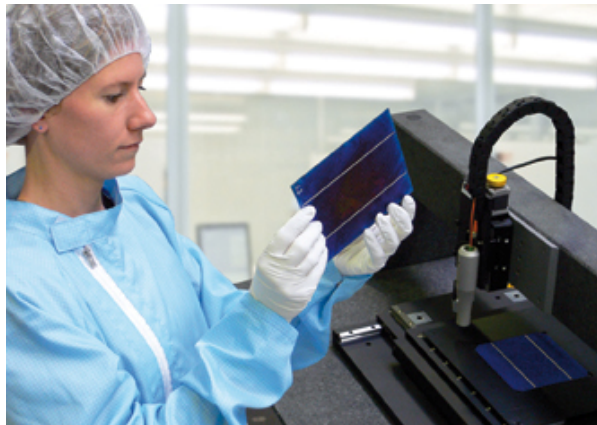
Topographie: Verschleiß

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Bad Sachsa, 16.-17. Februar 2016



■ Vielen Dank für Ihre Aufmerksamkeit



FRT, Fries Research & Technology

FRT, Fries Research & Technology GmbH
Friedrich-Ebert-Strasse
51429 Bergisch Gladbach
Deutschland
Tel.: +49 (0) 2204 - 84 2430
Fax: +49 (0) 2204 - 84 2431

FRT Shanghai Co., Ltd.
Room A18, 3rd Floor,
No.475 Fute No. 1 Rd. (W.)
Waigaoqiao Free Trade Zone,
Shanghai, China 200131
Tel.: +86 21 - 3876 0907
Fax: +86 21 - 3876 0917

FRT of America, LLC
West Coast Office
1101 South Winchester Blvd.,
Suite L-240
San Jose, CA 95128, USA
Tel.: +1 408 - 261 2632
Fax: +1 408 - 261 1173
Kostenfrei: 1-866-FRT PROF

FRT of America, LLC
East Coast Office
48 South Road, Unit #1
Somers, CT 06071, USA
Tel.: +1 860 - 749 3885
Fax: +1 860 - 749 3899

Internet
www.frt-gmbh.com

E-Mail
info@frt-gmbh.com