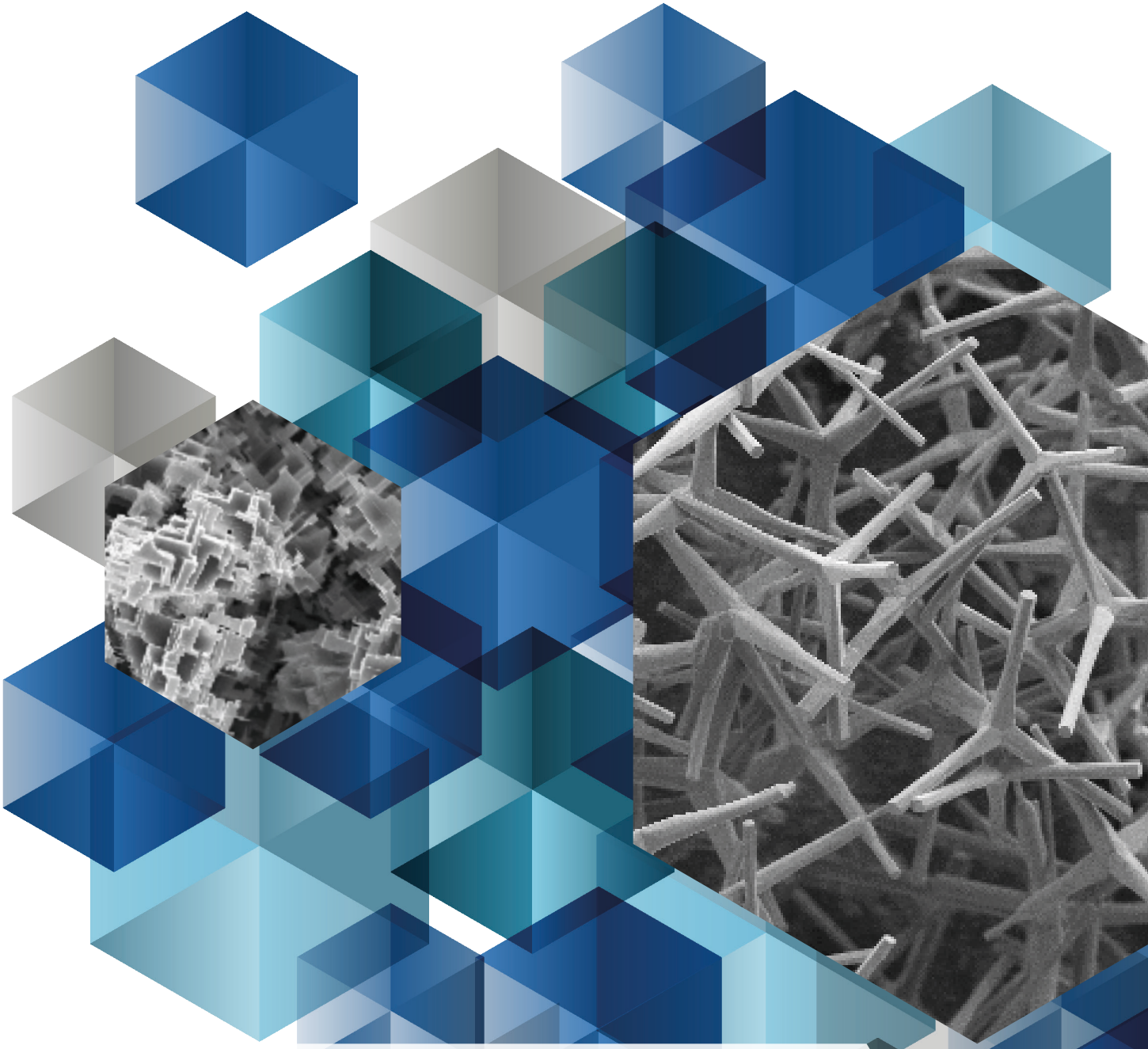
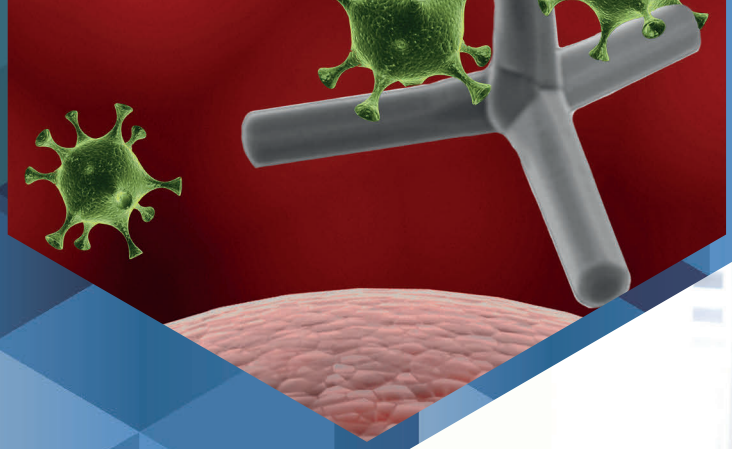
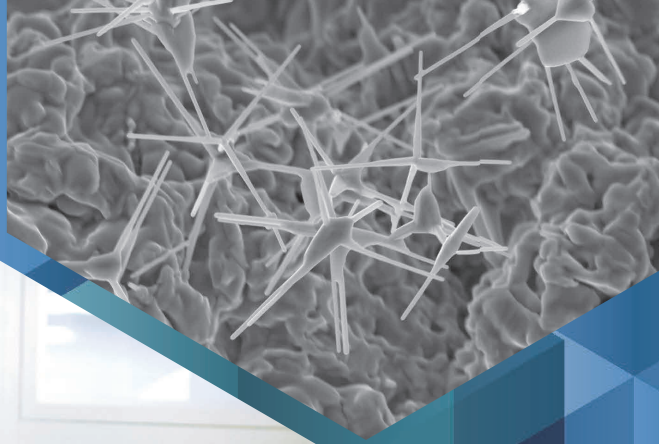
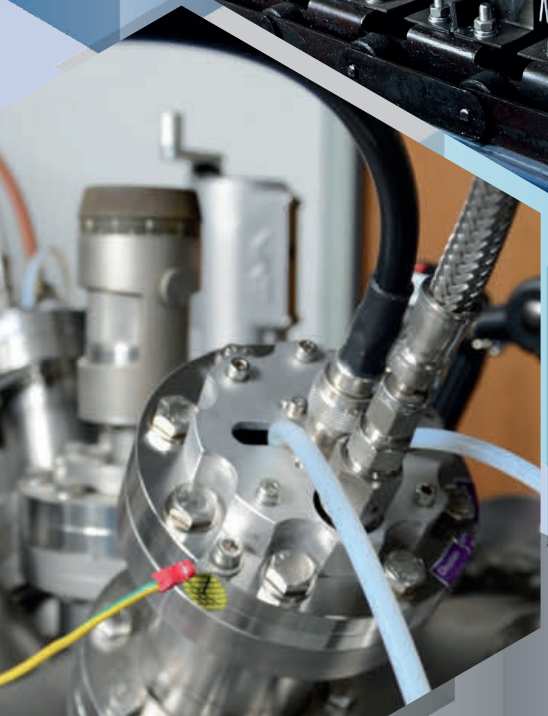


Phi-Stone AG

Service Catalogue







Engineering Today Materials of Tomorrow

Our Services

Phi-Stone AG is a team of young scientists and engineers which deals with the development of new technologies and solutions to existing problems.

Due to many projects in cooperation with the faculty of engineering of Kiel University, our experienced employees have profound skills in the field of material analysis. From tensile testing to scanning electron microscopy - we deal with your characterization tasks.

Development of material

As the Phi-Stone AG acts as a link between university and industry, we have access to most recent developments from the branch of materials science.

Our knowledge in the field of polymers, functional additives as well as structuring of metal surfaces allows the development of completely new materials, processes and technologies.

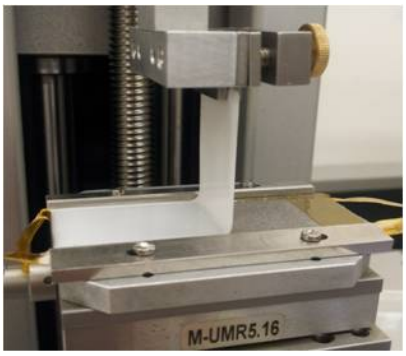
Analytical methods

Numerous technological questions in economics request for deeper insights into certain materials. Whether quality management, failure analysis or associated product development, we offer advanced analytical methods.

Driven by the strong collaboration with Kiel University, we are able to offer a broad spectrum of analytical methods from classical destructive material testing analysis down to sub-micron scale using large equipment.

Please find a short overview of our capabilities on our analytic-portfolio listed below. You are most welcome to discuss your individual questions with our team to find a corresponding method. We are also able to deal with topics outside our subject area like biology or medicine.

Mechanical testing

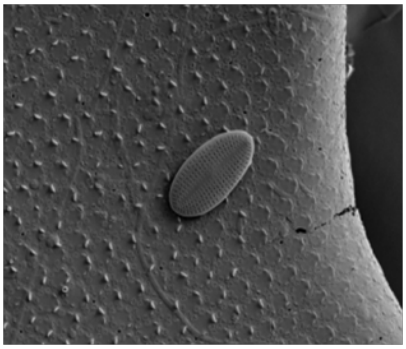


In our thoroughly equipped laboratories, our experienced employees implement material testing conforming to standards. Whether plastics, metals or composites, we know the individual solution to your specimen.

We offer:

- **Tensile testing**
- **Shear test**
- **Pull-off test**
- **Bending test**
- **Peel test**
- **Hardness test to Shore A and D**
- **Ball-falling test**

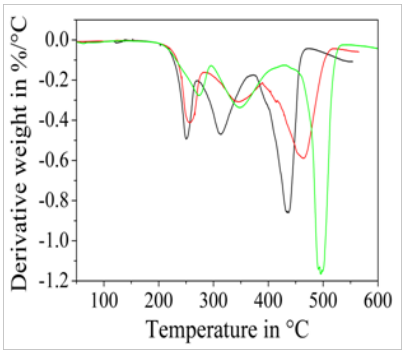
Scanning-electron-microscopy



Scanning-electron-microscopy (SEM) allows the pictorial representation of small objects down to the nanometer-range. In association with energy dispersive X-ray spectroscopy, the elemental composition can be determined. We offer:

- **SEM imaging**
- **EDX elemental mapping**
- **Determination of particle sizes, length of fibers**
- **Damage assessment**

Thermo analysis



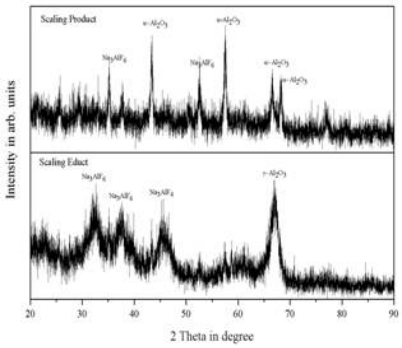
Thermogravimetric analysis (TGA) allows the determination of mass changes of a specimen in dependency of temperature and time. The analysis may be conducted under air or inert gas flow (nitrogen/argon). We can determine:

- **thermal stability**
- **melting ranges**

X-ray diffraction

X-ray diffraction (XRD) enables the determination of crystal structures or crystalline materials. We offer:

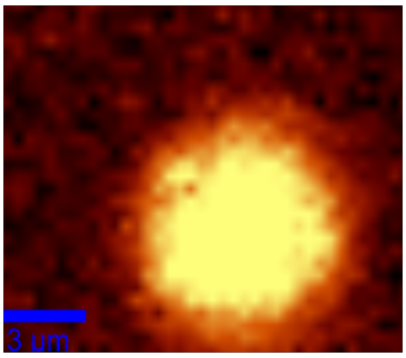
- **Crystal structure analysis**
- **Determination of lattice parameters**



Raman-spectroscopy

Raman-spectroscopy allows the quantitative analysis of organic and inorganic specimens. By means of the 'fingerprint', identification of materials is also possible.
We offer:

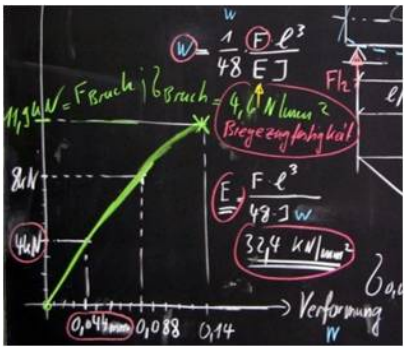
- **Imaging of different components by Raman-imaging/depth-profiling**
- **Determination of polymers or inorganic compounds**
- **Determination of inorganic oxides**



Questions?

Our offer does not contain the appropriate tool for your question?

Please call, we design a special solution for your individual analysis task.



info@phi-stone.de

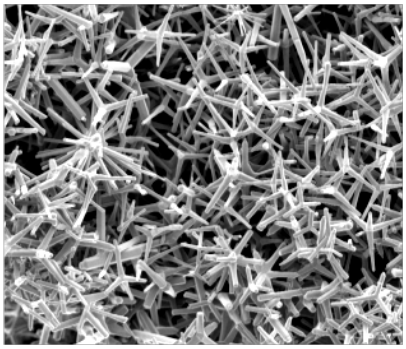
+49 431 7054186

Polymer development

High performance of systems and components requires high-performance materials. If standard-materials do not meet your demands, we develop special components with the required individual service features:

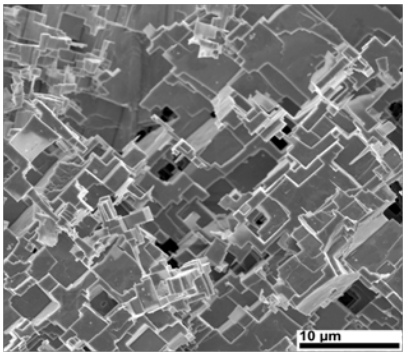
- **Extension of lifeduration of plastics**
- **Minimization of friction wear**
- **Increase of mechanical strength**
- **Electrical/thermal conductivity of polymer components**
- **Surface modification**

Functional additives



Phi-Stone AG produces special additives, which are distributed under the protected trademark CSP (Core Spike Particles).
These particles have special features and are utilized within the field of polymer development and medical application.

Surface-structuring



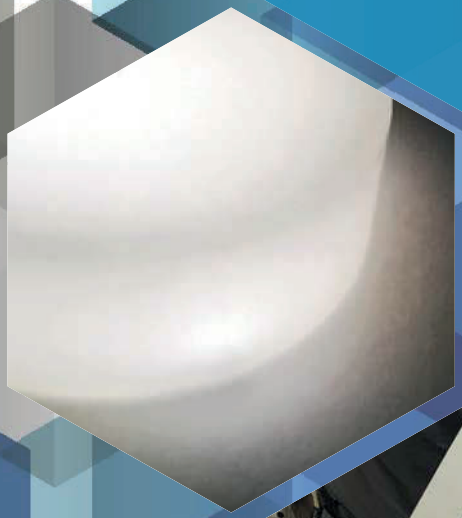
The essentail challenge within plastic-metal-junctions is depicted by the interface which in principle inhibits the formation of strong bonding. With our novel surface-structuring method, we are able to increase the mechanical stability of these junctions many times by mechanical interlocking. We offer:

- **Surface-structuring of many metals and alloys**
- **High-strength polymer-metal-linking**
- **High-strength metal-metal-bonding (without thermal energy input!)**

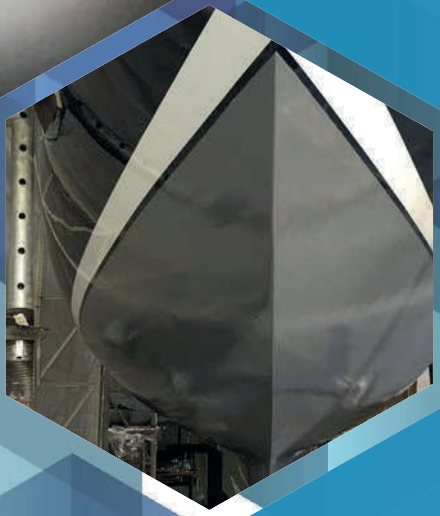
Bereits realisierte Produkte und Anwendungen

Verbundhaftung von Polymeren durch CSP® für mehrlagige Schläuche

CSP® als funktionaler Zusatz zur Herstellung von Formulierungen und Dispersionen z.B. für medizinische Produkte

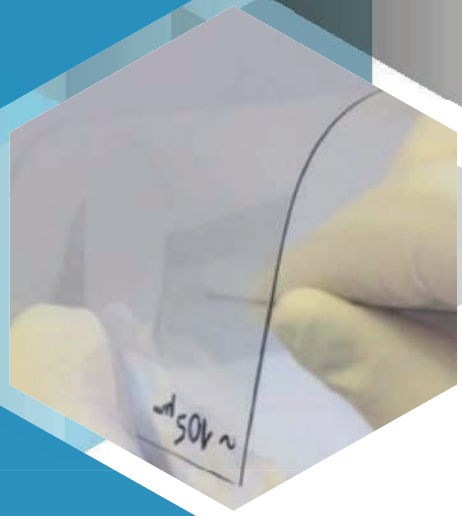


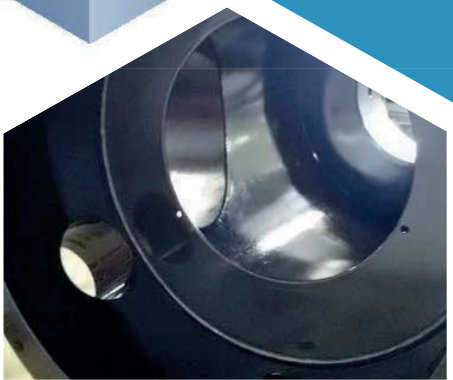
Chemikalienbeständige LED-Beleuchtung aus CSP®-Cristasit für Geflügel- und Tierhaltung



Umweltneutrale, biokorrosionsbeständige CSP®-Langzeit Unterwasserbeschichtung für Sportboote

Transparente CSP®-Polymerkomposite für die Herstellung von abschirmenden Verbundfolien





Reibungsminimierte CSP®-Polymerkomposite als Behälterbeschichtung

Phi-Stone AG

Wissenschaftliche Leitung

Phi-Stone AG -
FUMT R&D GmbH

Kaiserstraße 2
24143 Kiel

Produktion & Verwaltung

Phi-Stone AG

Dorfstraße 2
24247 Mielkendorf

Tel.: +49 431 7054186
Email: info@phi-stone.de

www.phi-stone.de