




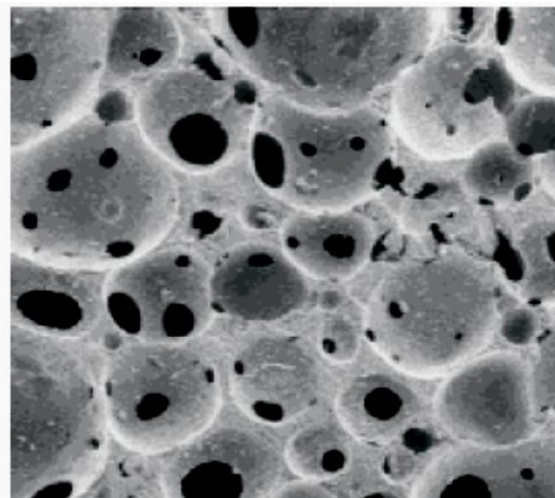
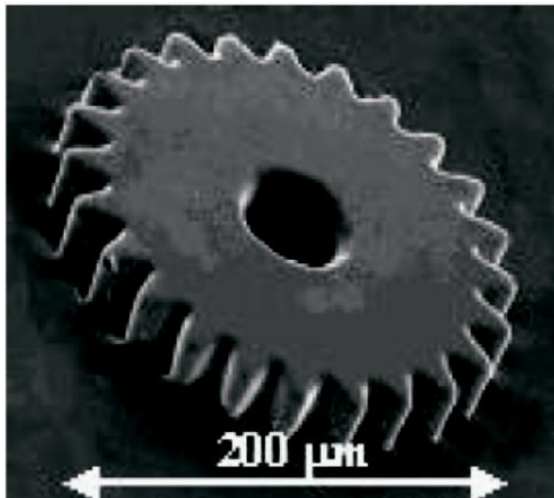
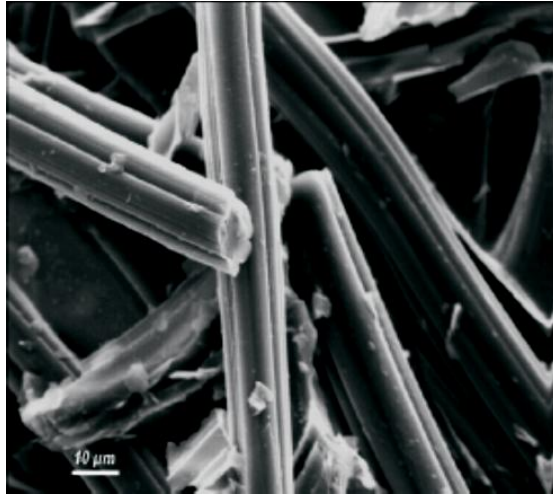
# Aus Polymer abgeleitete SiOC-Beschichtungen mit kontrollierten Oberflächeneigenschaften

Boris Reznik, Henning Bockhorn  
Karlsruher Institut für Technologie (KIT)

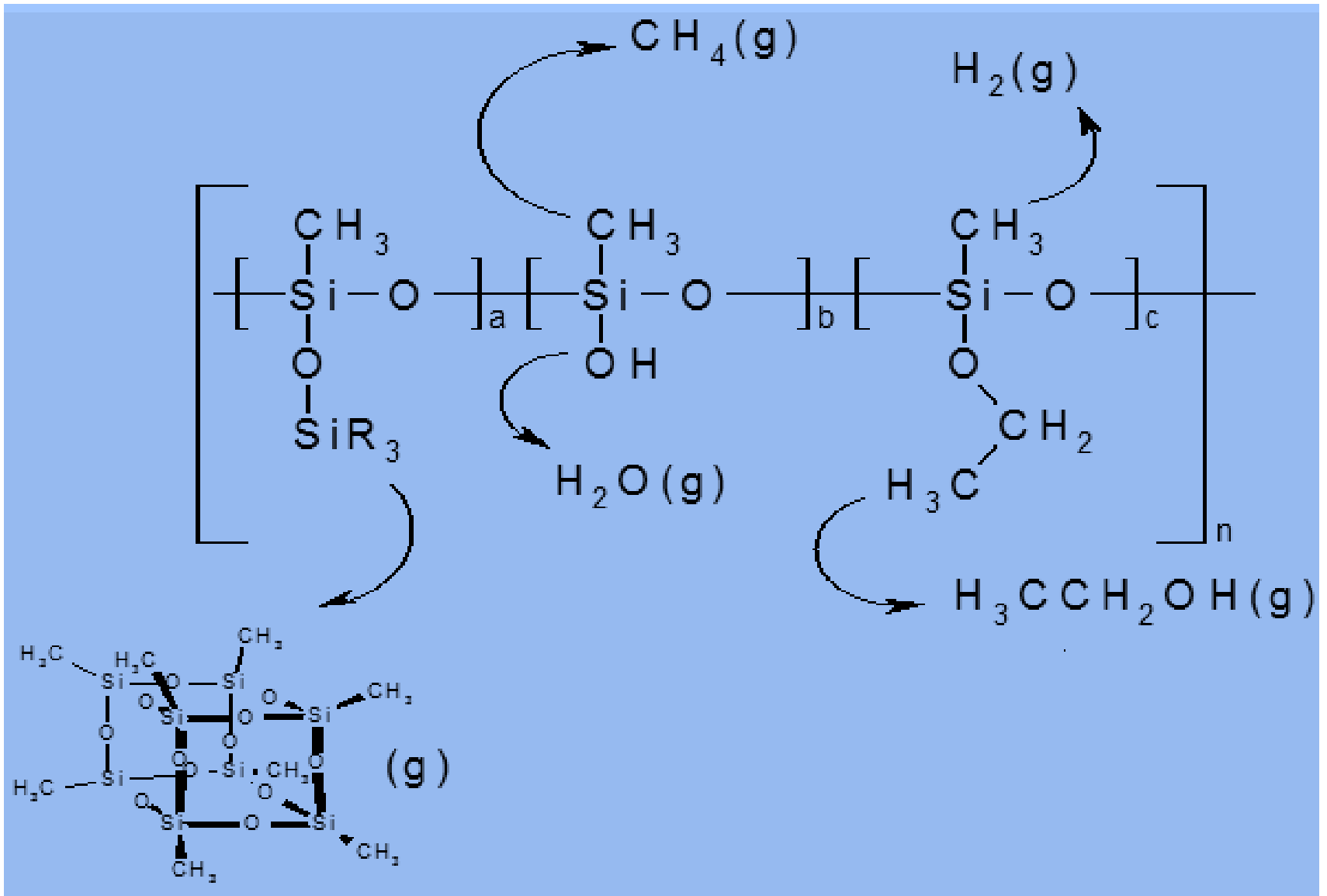


Frühjahrstagung 20. März 2013  
„Kohlenstoffe - Keramik“ Bauhaus-Universität Weimar

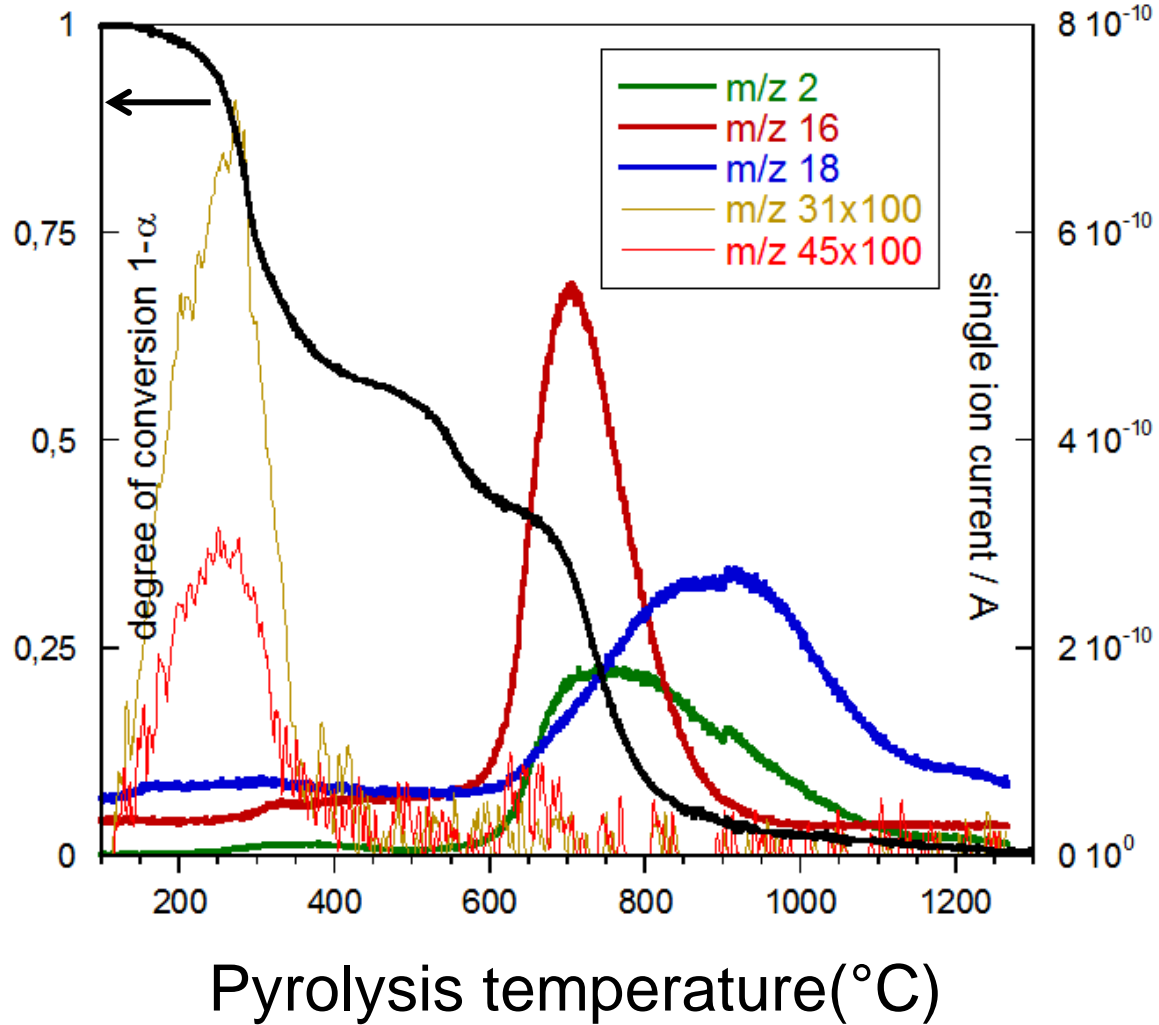
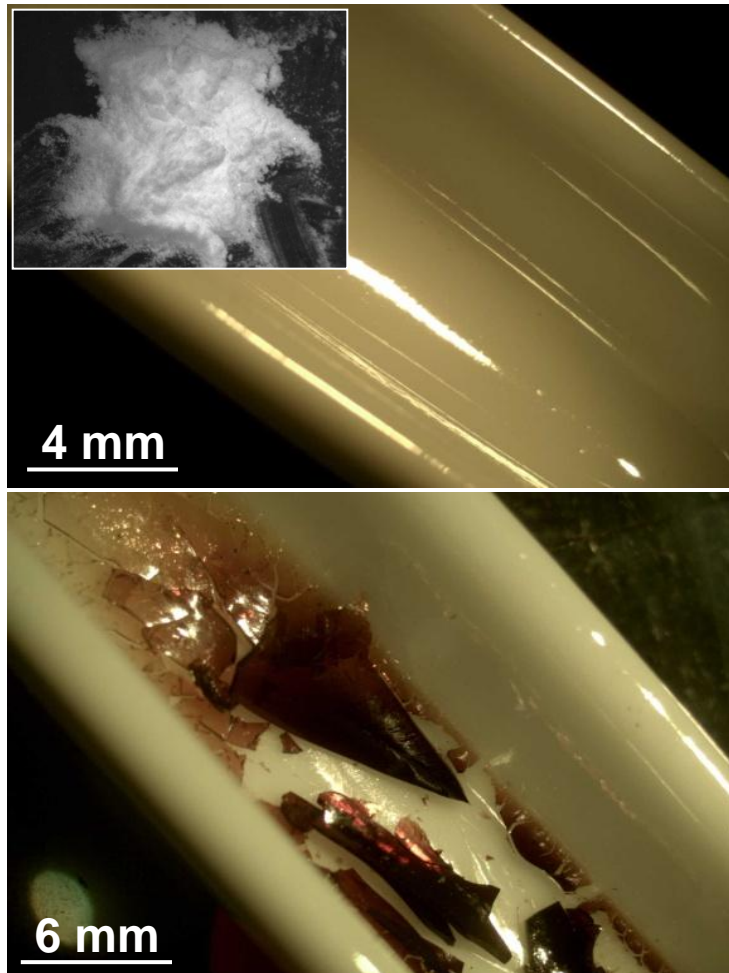
# Applications of SiOC



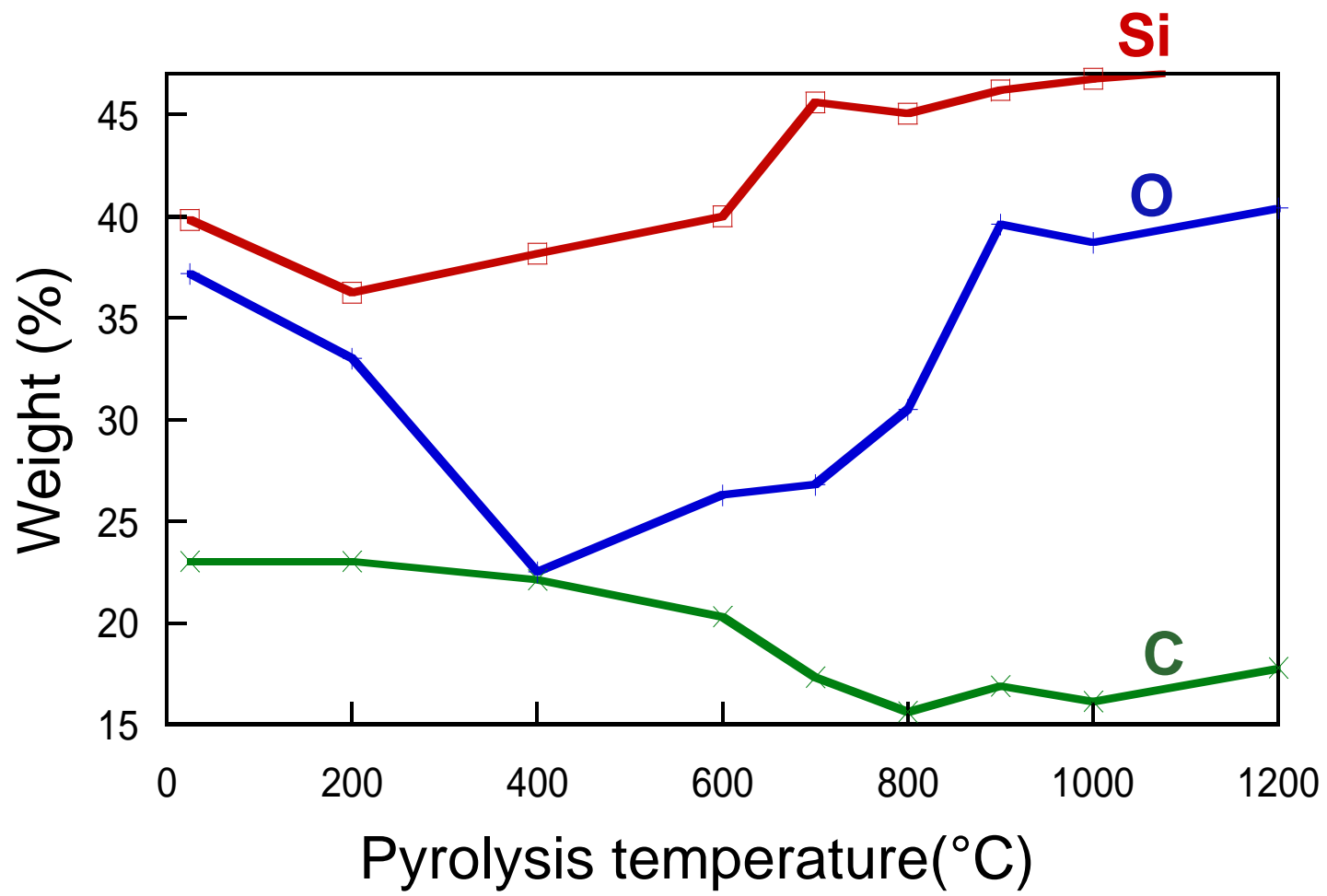
# Siloxane resin



# Pyrolysis of siloxane resin



# Chemical composition of SiOC



B. Reznik, H. Bockhorn, *Silicone oxycarbide glasses with hybrid nanostructures*. Int.Conf. Multifunctional, Hybrid and Nanomaterials, Italy, Sorrento (2013)



# Mechanical properties of SiOC

<b>Pyrolysis temperature (°C)</b>	<b>Young's modulus (GPa)</b>	<b>Hardness (GPa)</b>
<b>400</b>	<b>1.4 ± 0.4</b>	<b>0.2 ± 0.4</b>
<b>600</b>	<b>3.7 ± 0.4</b>	<b>0.7 ± 0.4</b>
<b>800</b>	<b>35 ± 0.4</b>	<b>4 ± 0.4</b>
<b>1000</b>	<b>53 ± 0.4</b>	<b>8 ± 0.4</b>

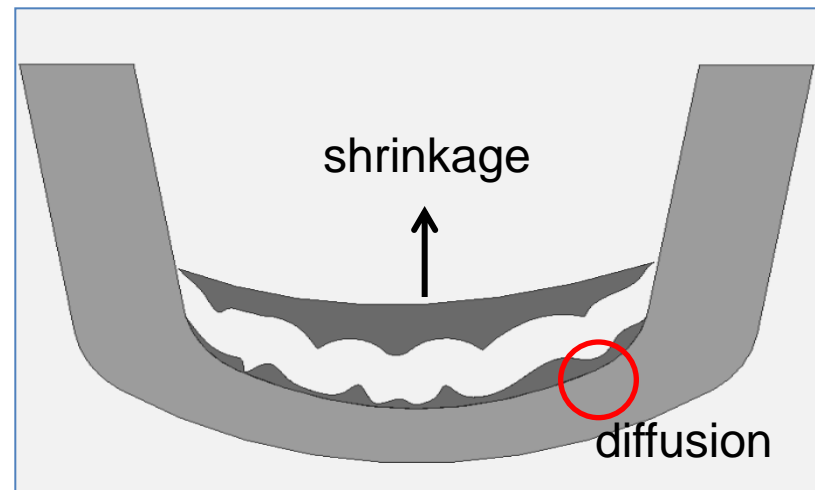
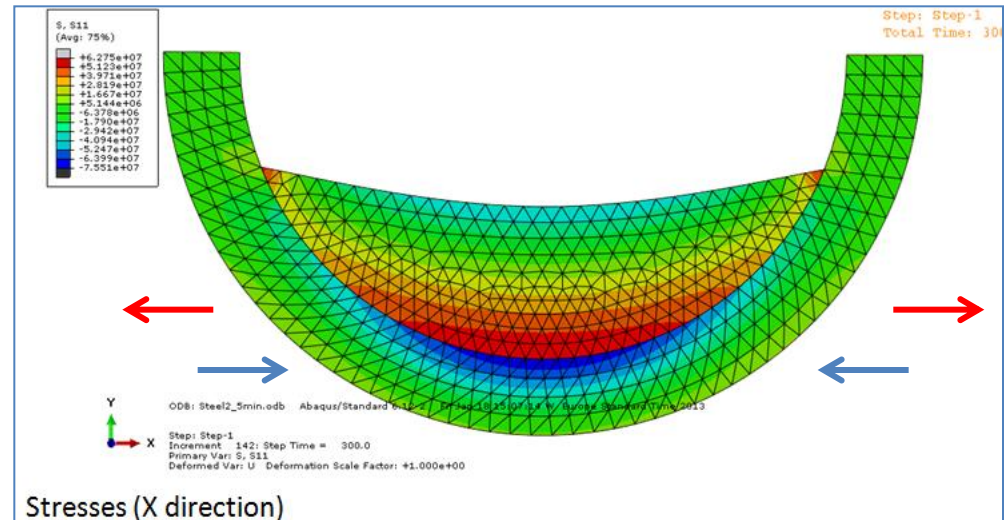
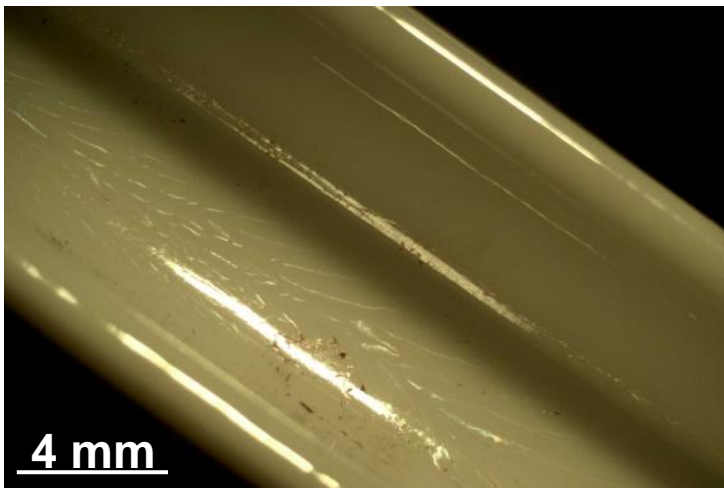
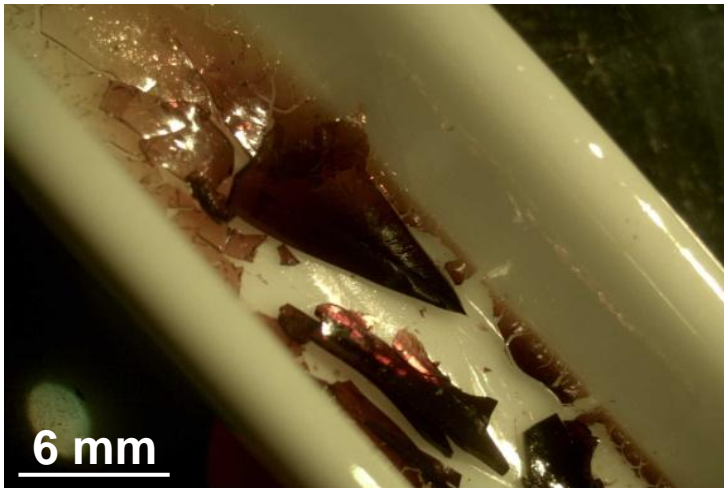
*fused silica,  
soda-lime glass*

70

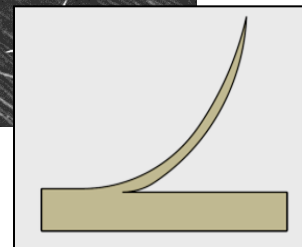
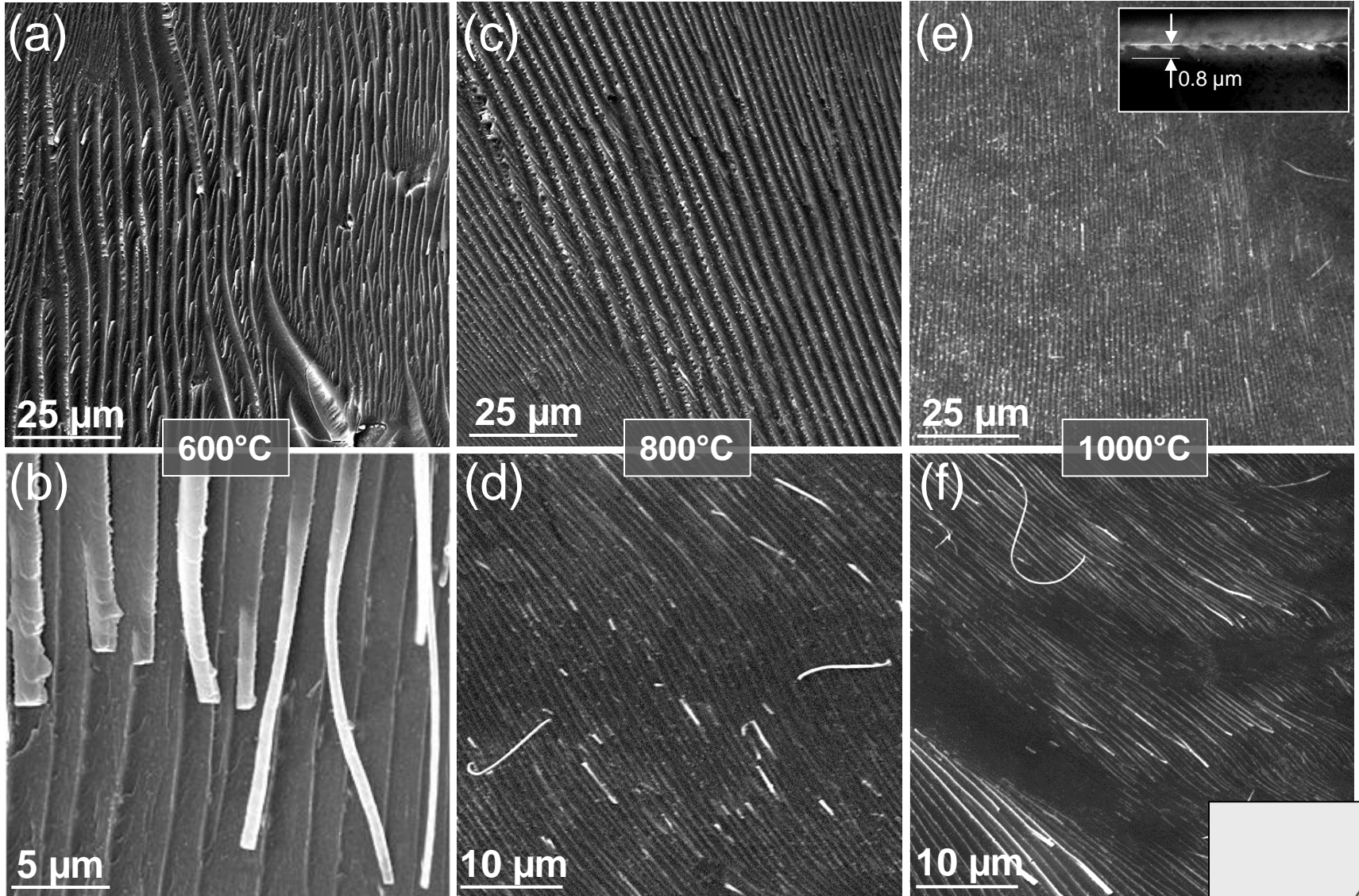
8

B. Reznik, H. Bockhorn, *Silicone oxycarbide glasses with hybrid nanostructures*.  
Int.Conf. Multifunctional, Hybrid and Nanomaterials, Italy, Sorrento (2013)

# Formation of SiOC coating



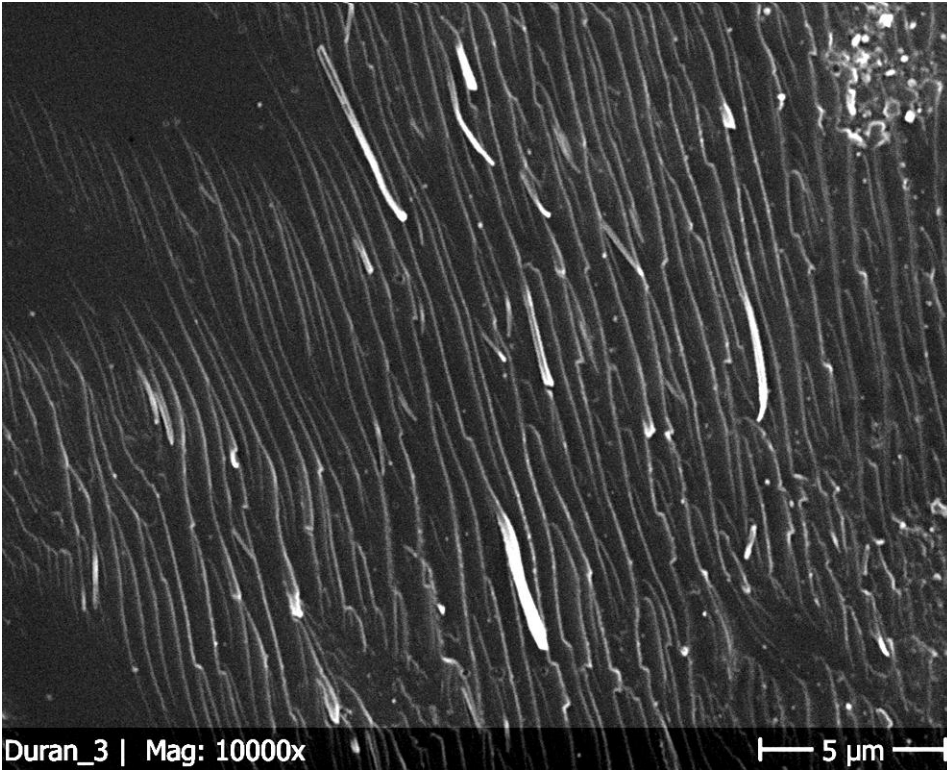
# SiOC coatings: porcelain



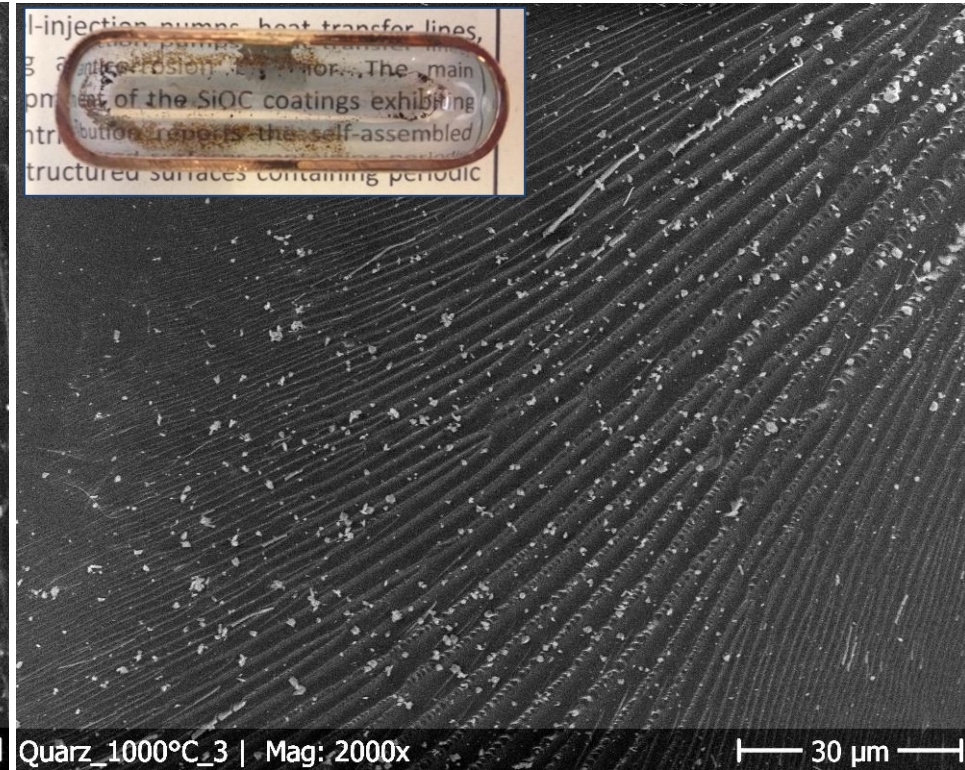


# SiOC coatings on glass substrates

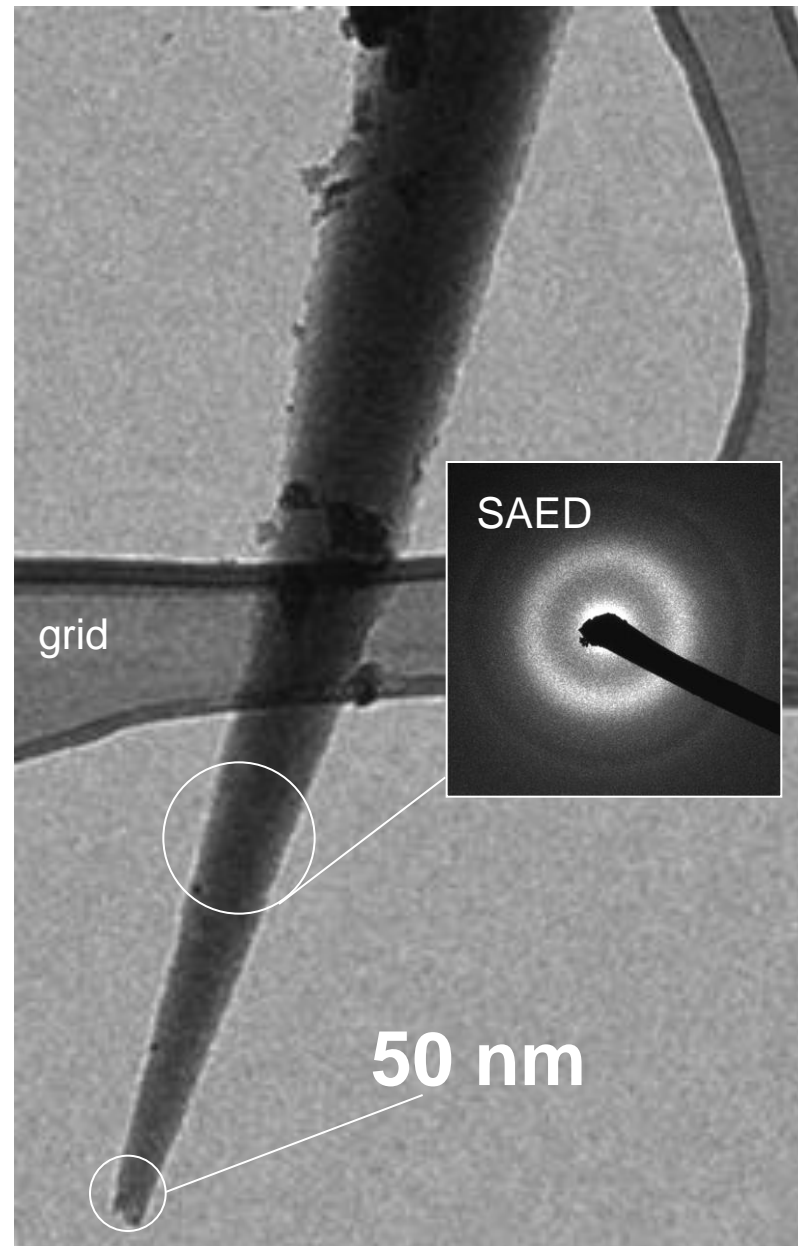
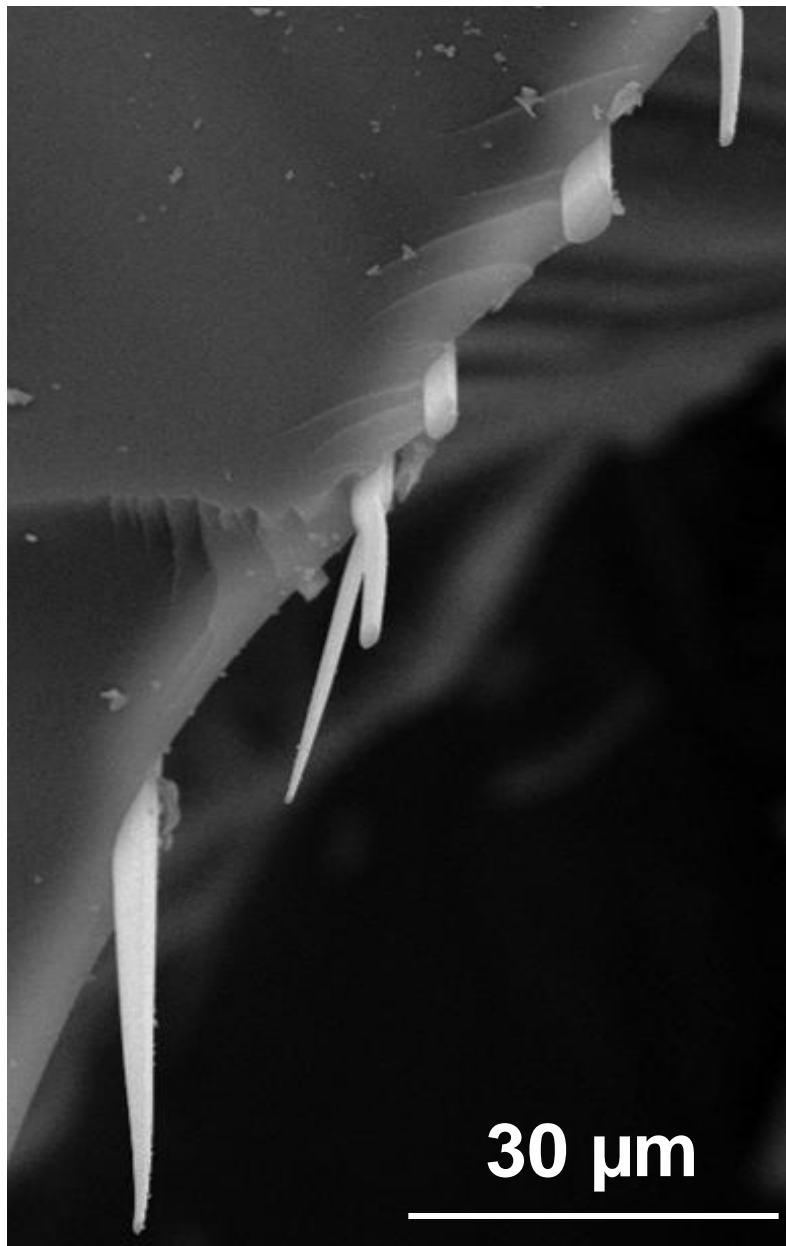
laboratory glass



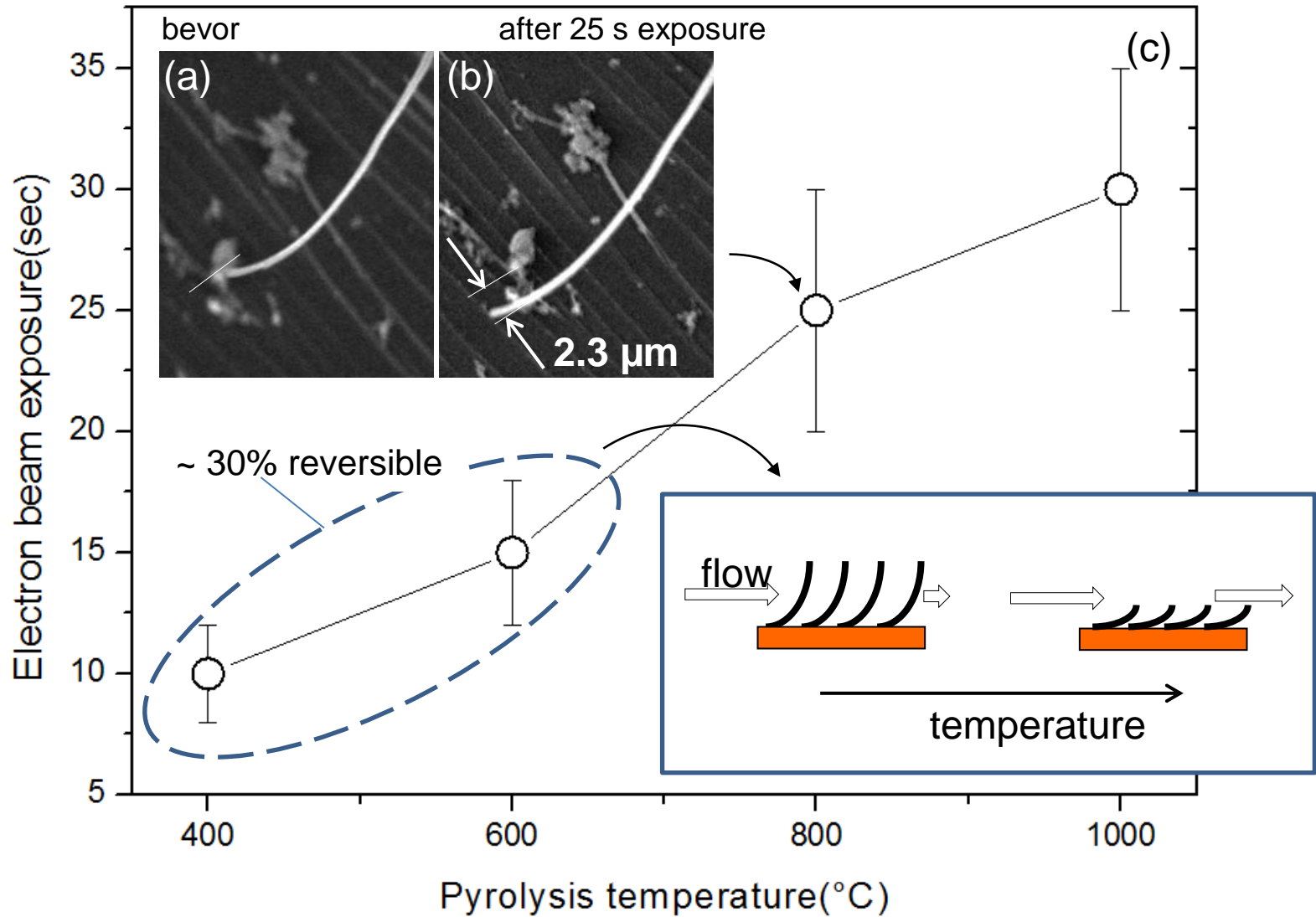
quarz glass



# Microstructure of SiOC filaments

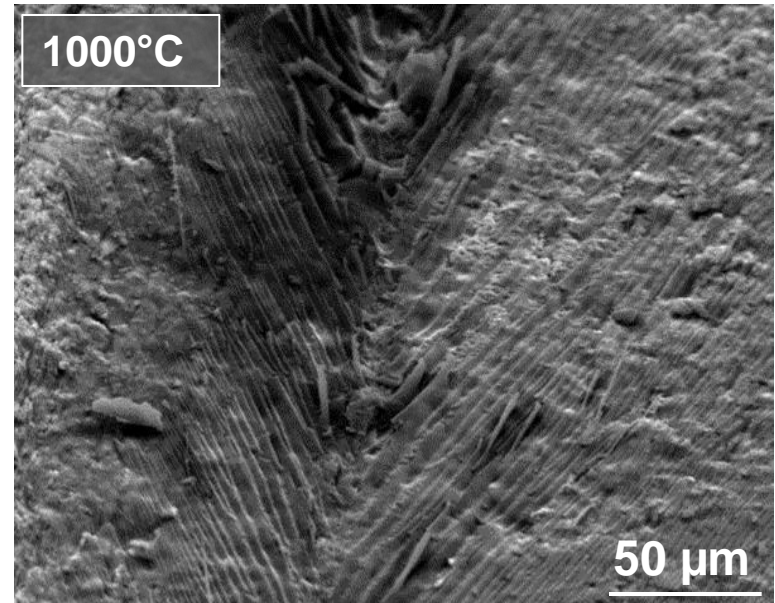
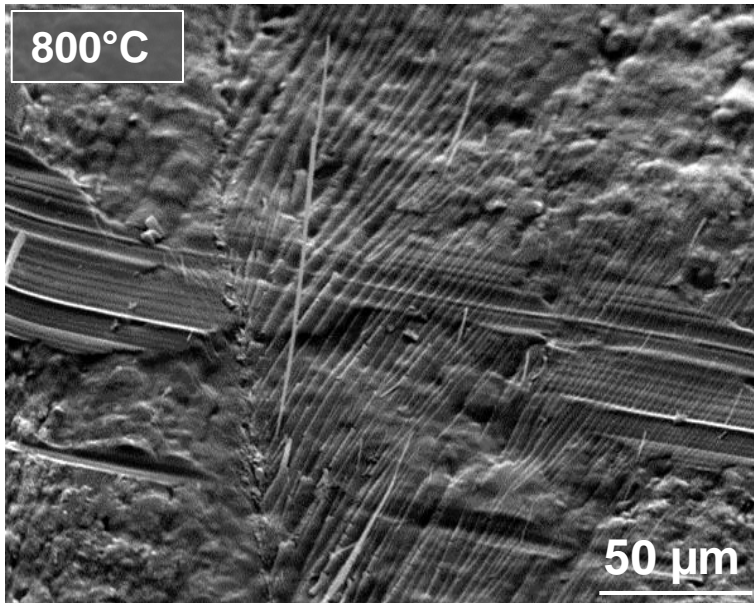
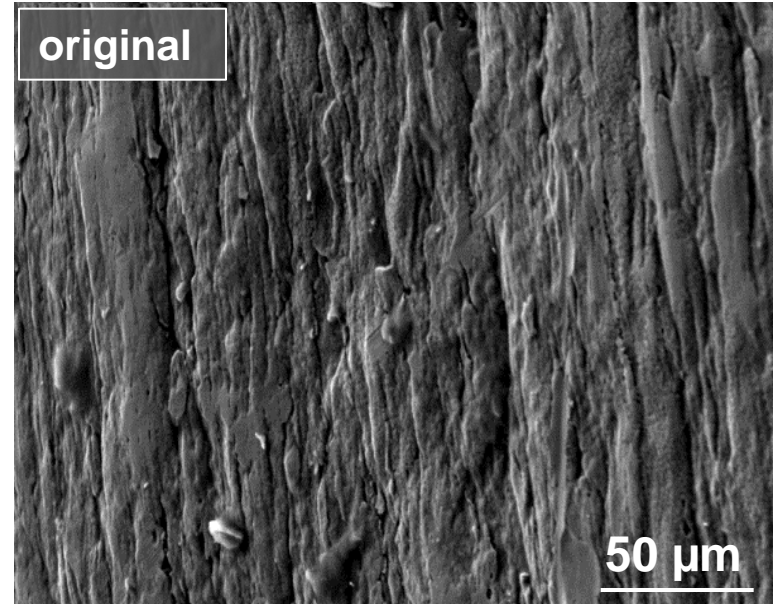
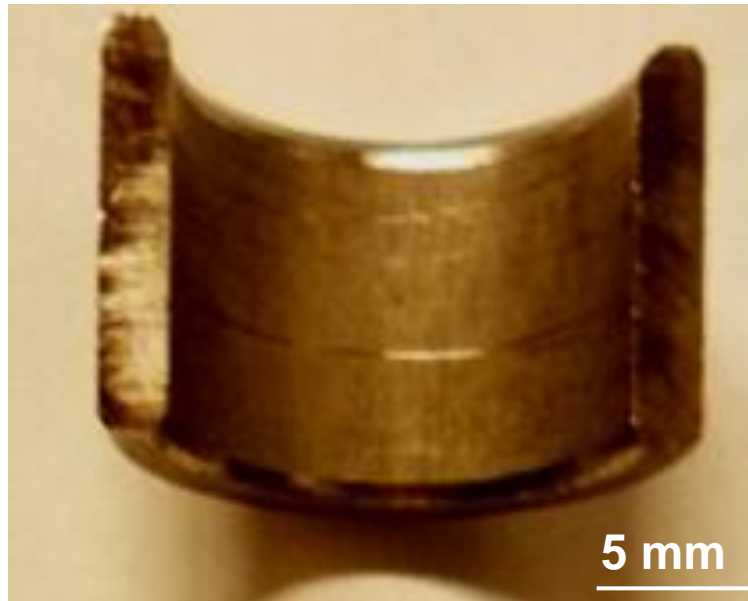


# Thermal sensitivity of SiOC filaments



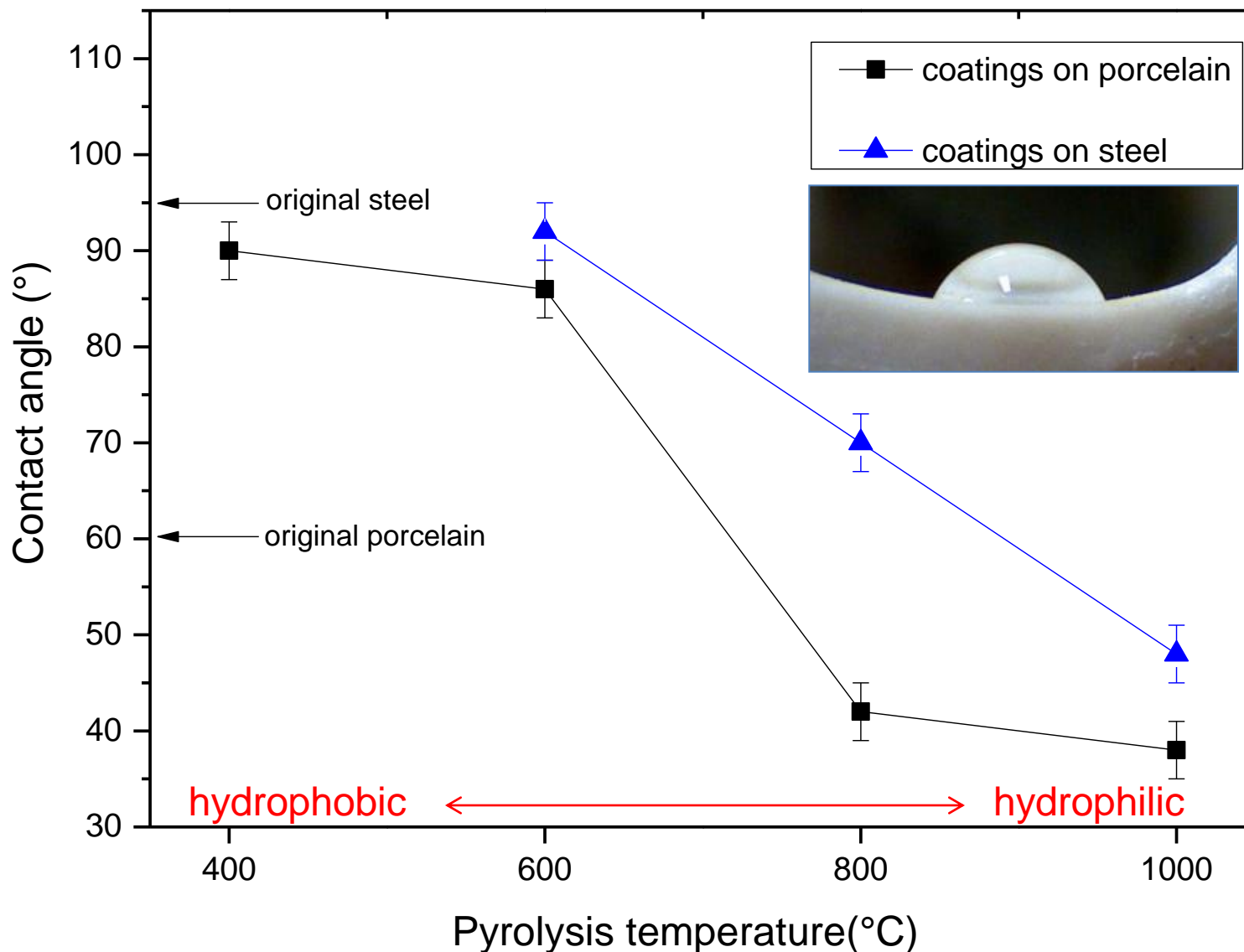


# SiOC coatings: steel substrate

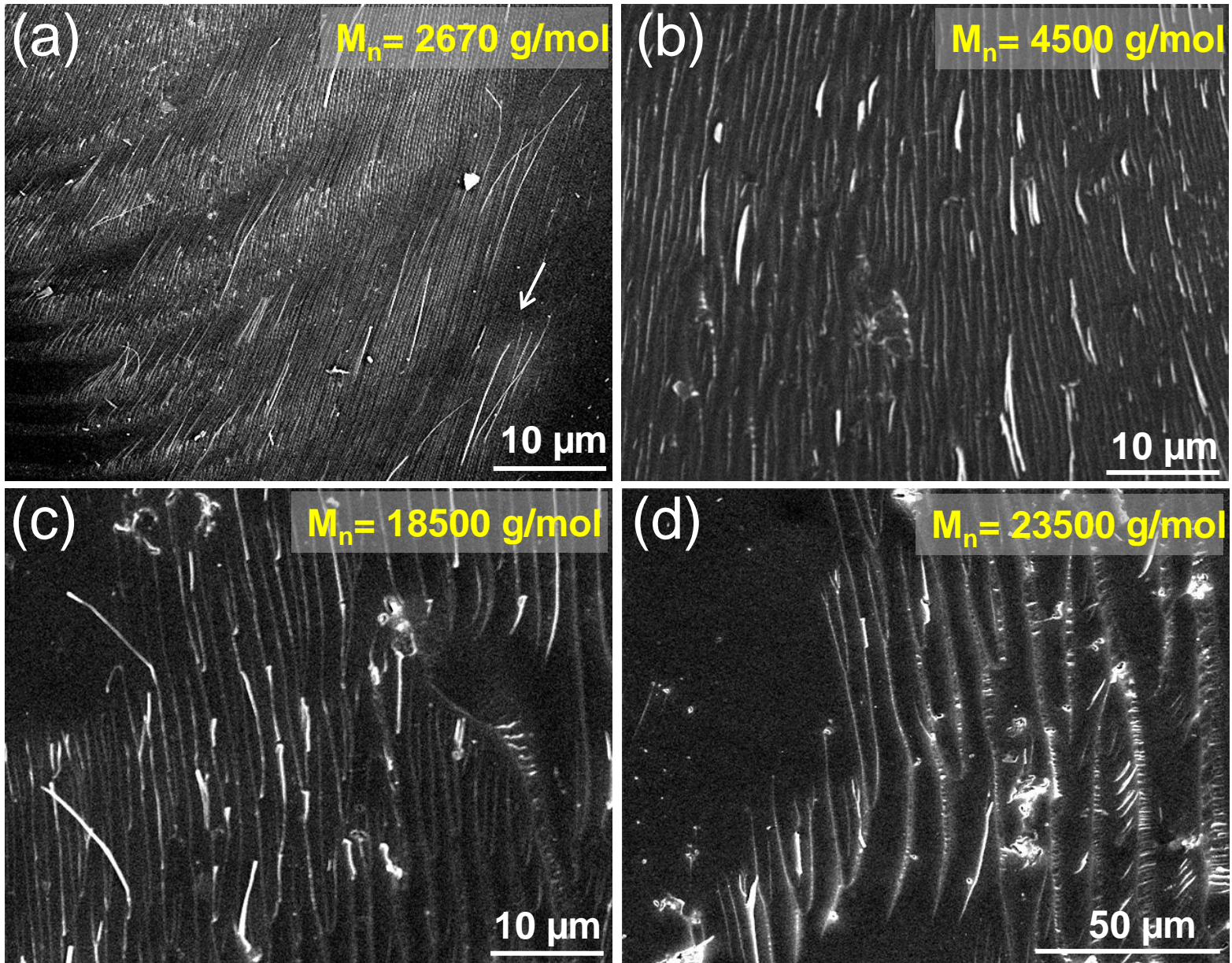




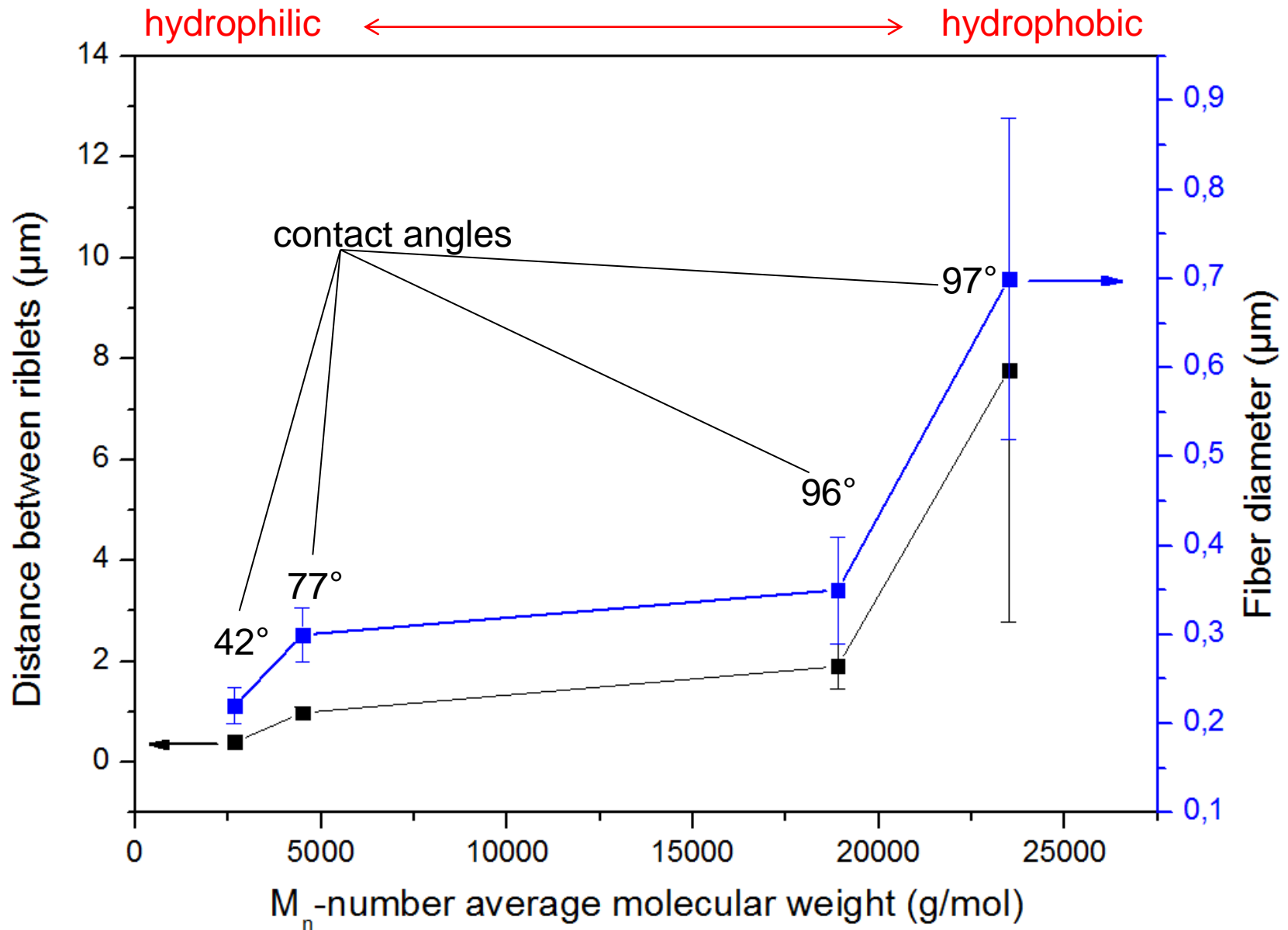
# SiOC coatings: surface properties



# Coating morphology: the effect of molecular weight



# SiOC coatings: surface properties

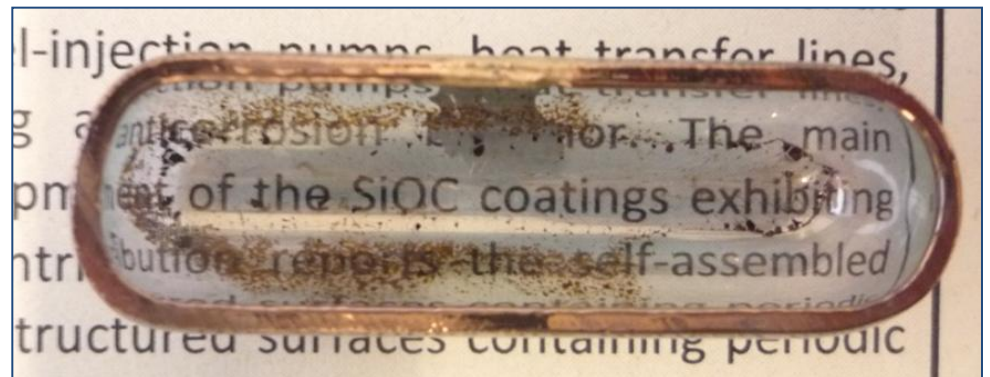


# SiOC coatings

- one-step coating method
- thin coatings at the macroscale
- variable surface properties
- concave substrates: metall, glass, ceramics

## Possible applications

- exhaust, pump pipes
- observation quartz windows
- sensor technology
- dosage technology





# Acknowledgements

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Forschungsgemeinschaft

**DFG**

**DFG-Projekt “ Silicone Oxycarbide Glasses with Adaptive Shark Skin-like Surface Patterns: Controlled Structuring and Heat Transfer Simulation“**