

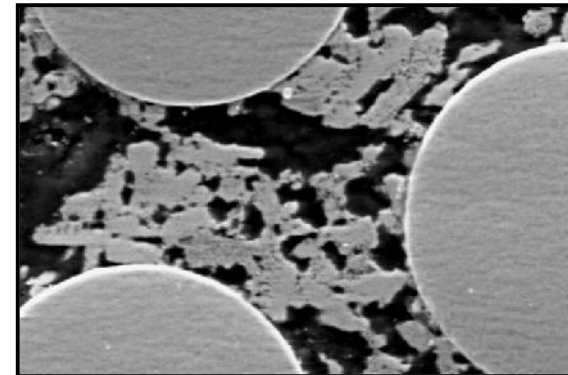
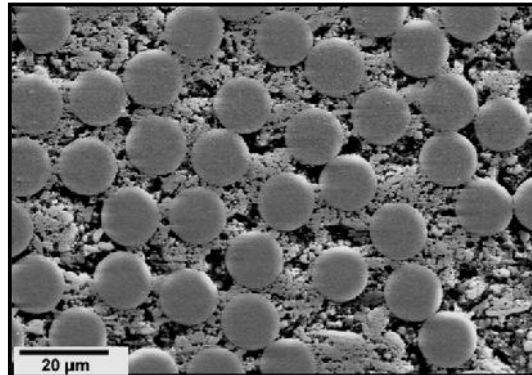
WHIPOX® long fibre, all oxide Ceramic Matrix Composite (OCMC) for industrial applications

Dr. Mathias Kunz, CEO
Dr. Jürgen Göring, CTO
WPX Faserkeramik GmbH, Cologne, Germany



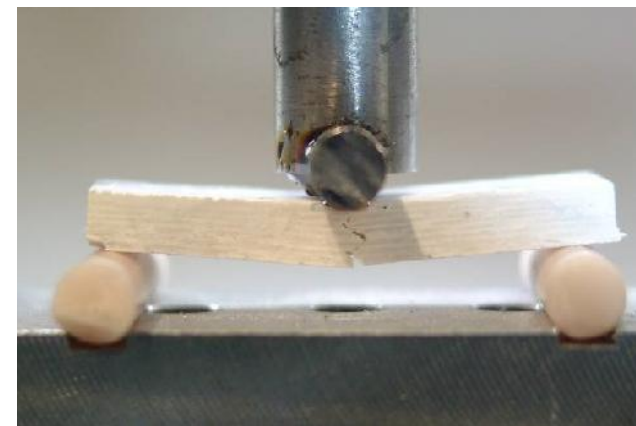
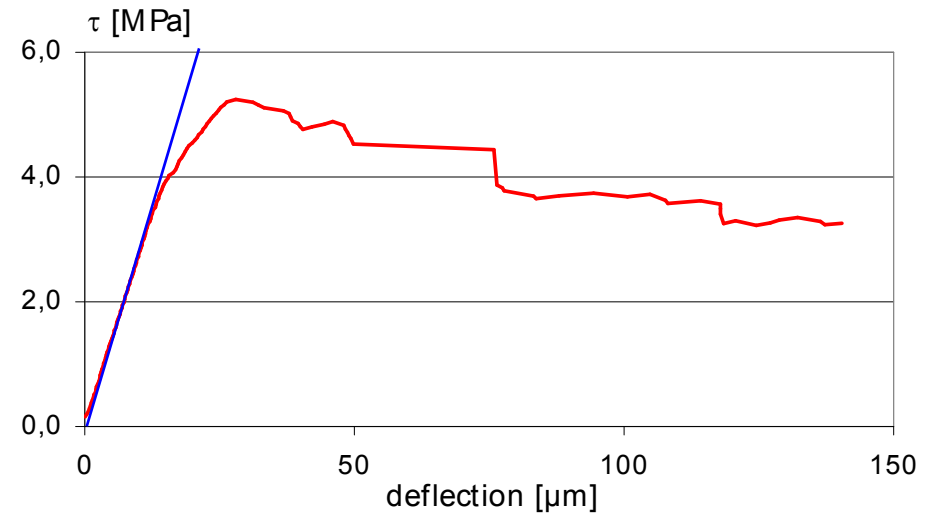
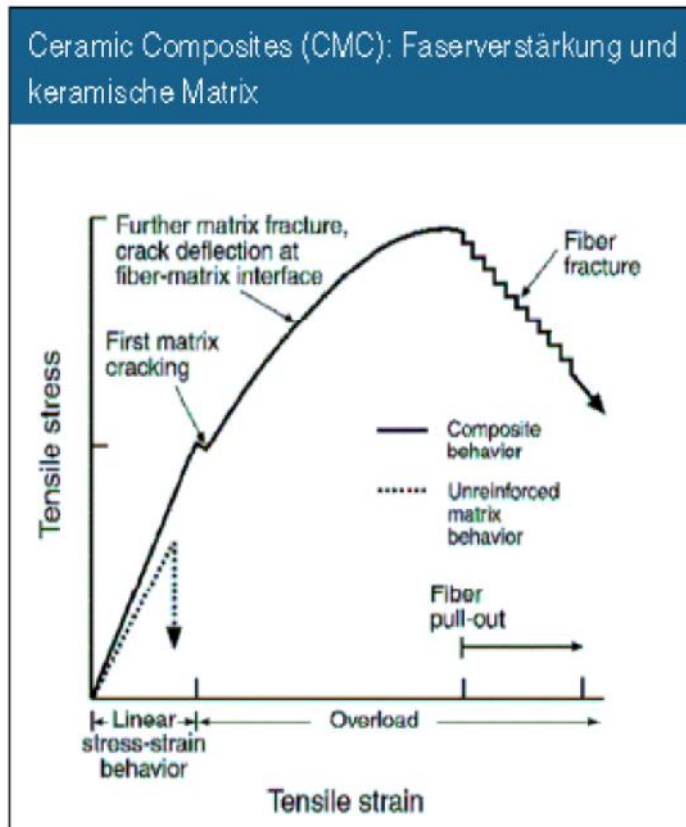
Materials 2014, Veldhoven, 16.4.2014

long fibre, all oxide CMC

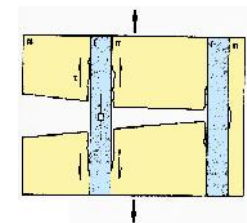
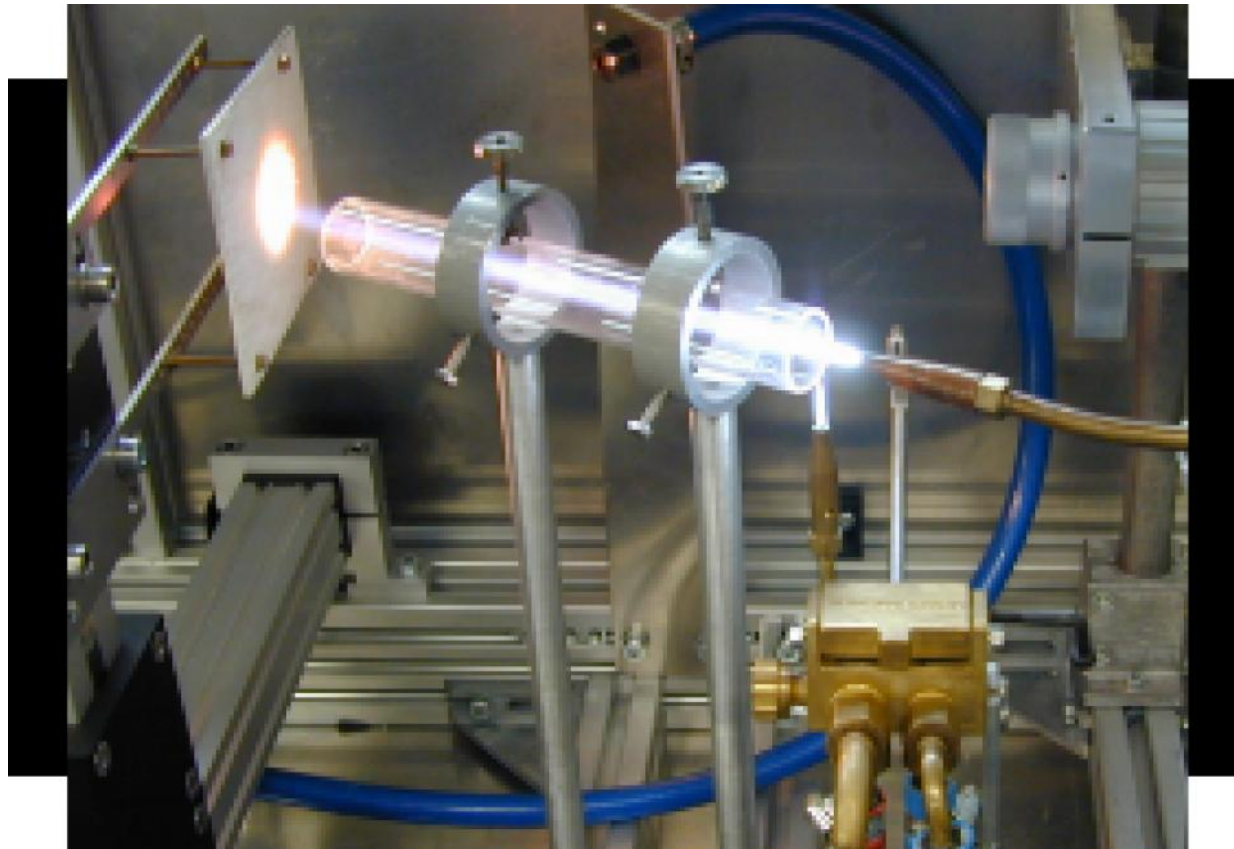


- WHIPOX: **W**ound **H**ighly **P**orous **O**xide CMC
- developed and patented by DLR German Aerospace Center with initial focus on aerospace and gas combustion turbine applications
- Excellent property combinations for industrial heat treatment of metals
- WPX Faserkeramik GmbH as DLR spin-off holds exclusive licences

Non catastrophic failure



Thermal shock resistance



other WHIPOX[®] properties



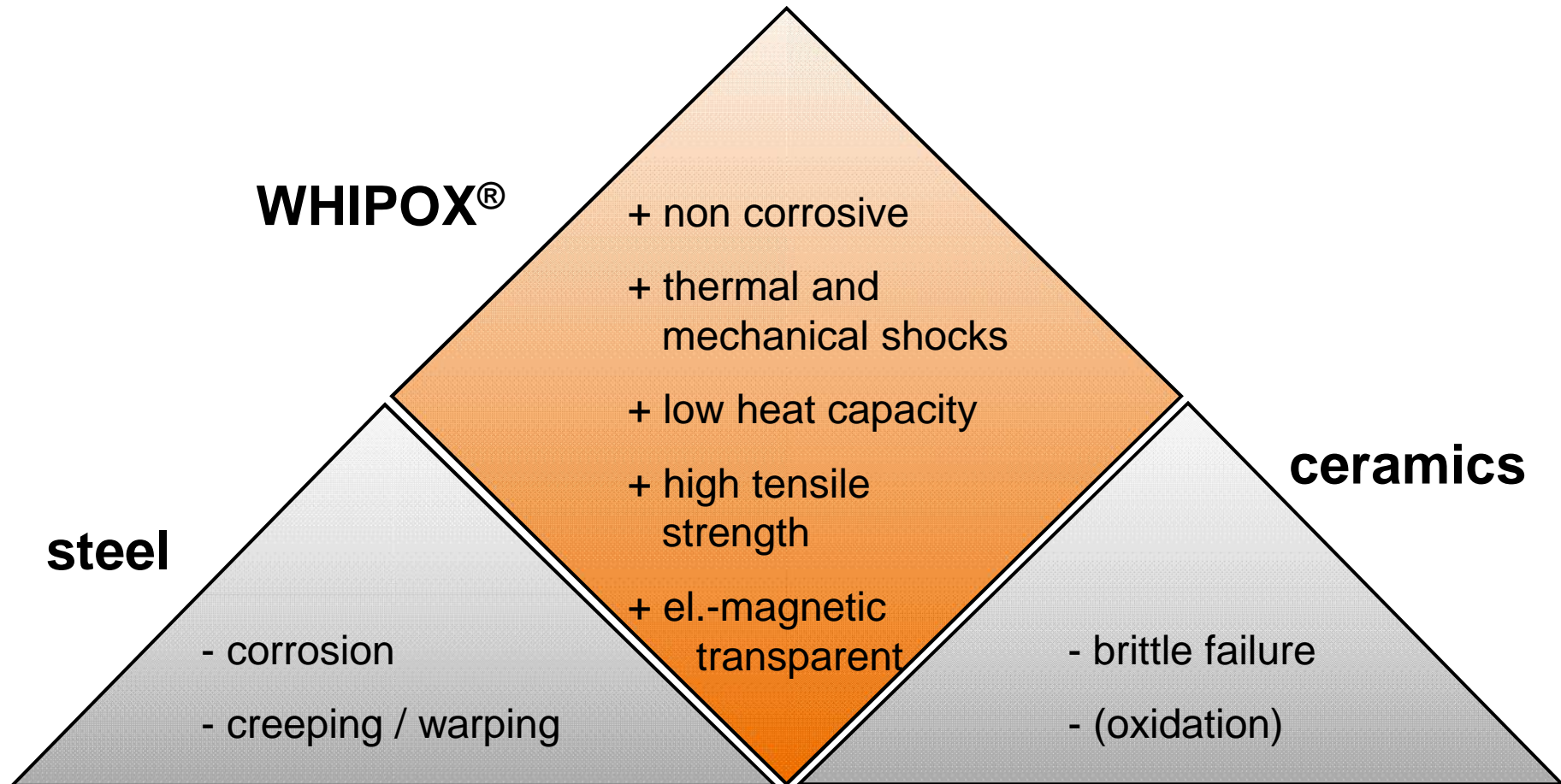
- Moderate mechanical stability in comparison to SiC – C
- + oxidation resistant, corrosion resistant
- + chemically inert
- + electromagnetic transparent
- o low thermal conductivity
- o electrical insulator

Property ranges of WHIPOX®

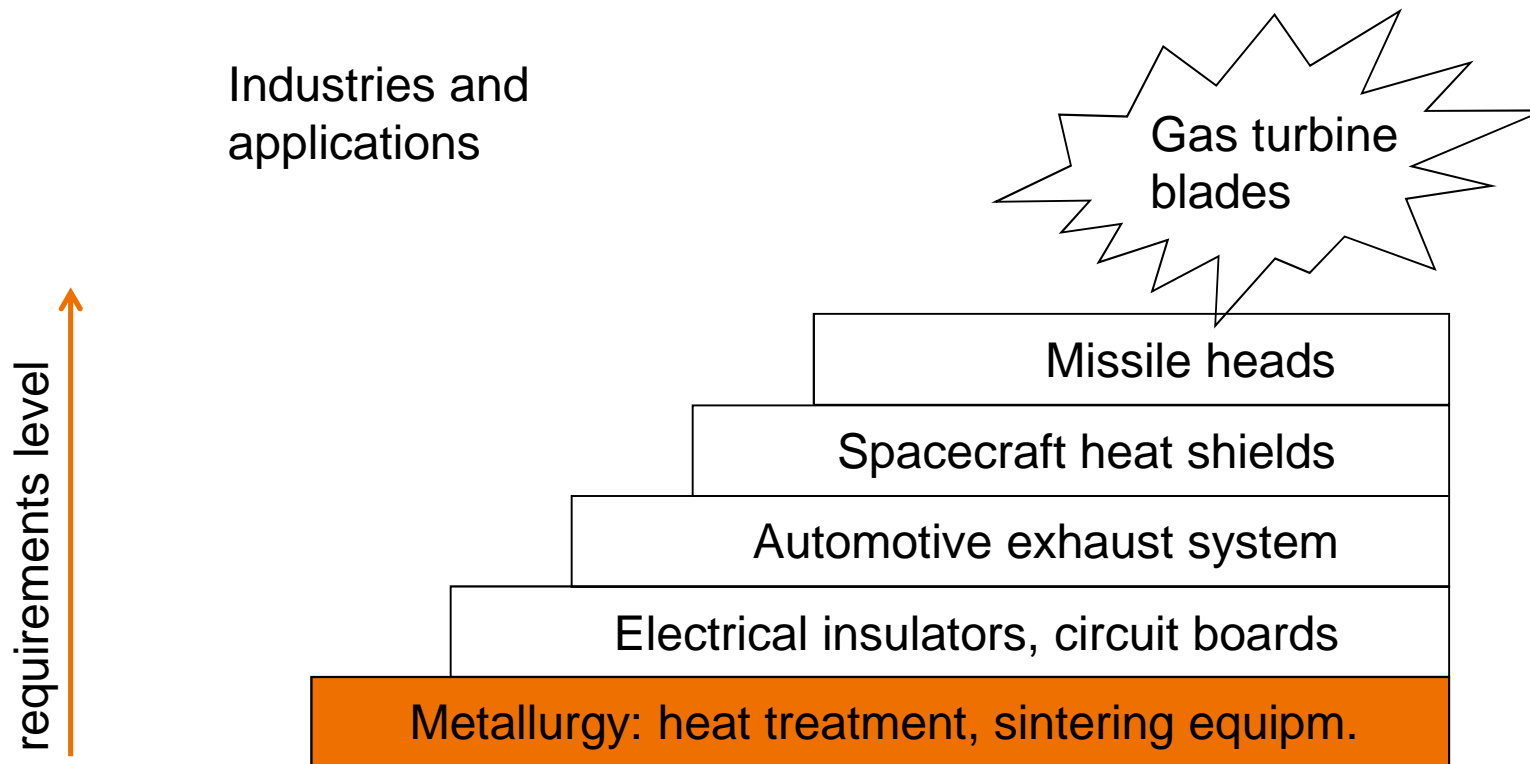
Tensile strength:	55 - 120	MPa
Bending strength:	80 - 700	MPa
Young's Modulus:	40 - 200	GPa
Interlaminar shear strength:	5 - 30	MPa
Density:	1.5 - 3.0	g/cm ³
Thermal conductivity (200°C):	0.5 - 5.7	W/mK
Thermal conductivity (1000°C):	0.4 - 2.7	W/mK
Thermal expansion:	4.3 - 8.4	10 ⁻⁶ /K
Total porosity:	25 - 50	Vol. %

**Wide range of properties
controlled by modification of
fiber content, type, winding
pattern and orientation and
matrix properties**

WHIPOX[®] USPs: combines ceramic and metallic properties at T = 750 to 1250 °C



WHIPOX[®] application potential: from heat treatment to combustion turbines



WHIPOX® components can be specifically manufactured, formed and machined



WPX Faserkeramik GmbH



WPX Faserkeramik GmbH
Building 51
Linder Hoehe
D-51147 Cologne
Germany

www.whipox.com

CEO Dr. Mathias Kunz
kunz@whipox.com

Co. established in 2007
tax-ID DE 258912577