:FutureCarbon

Contents

FutureCarbon GmbH: Company Data

_ Address:
Gottlieb-Keim-Strasse 60
95448 Bayreuth, Germany

_ Founded in 2002

_ Share Holders:
FutureCamp GmbH, Munich
S-Refit AG, Regensburg

_ Number of coworkers: 12

_ Professions:
Chemistry, Physics,
Chemical Engineering,
Mechanical Engineering,
Material Sciences, Economy

FutureCarbon – Key Applications

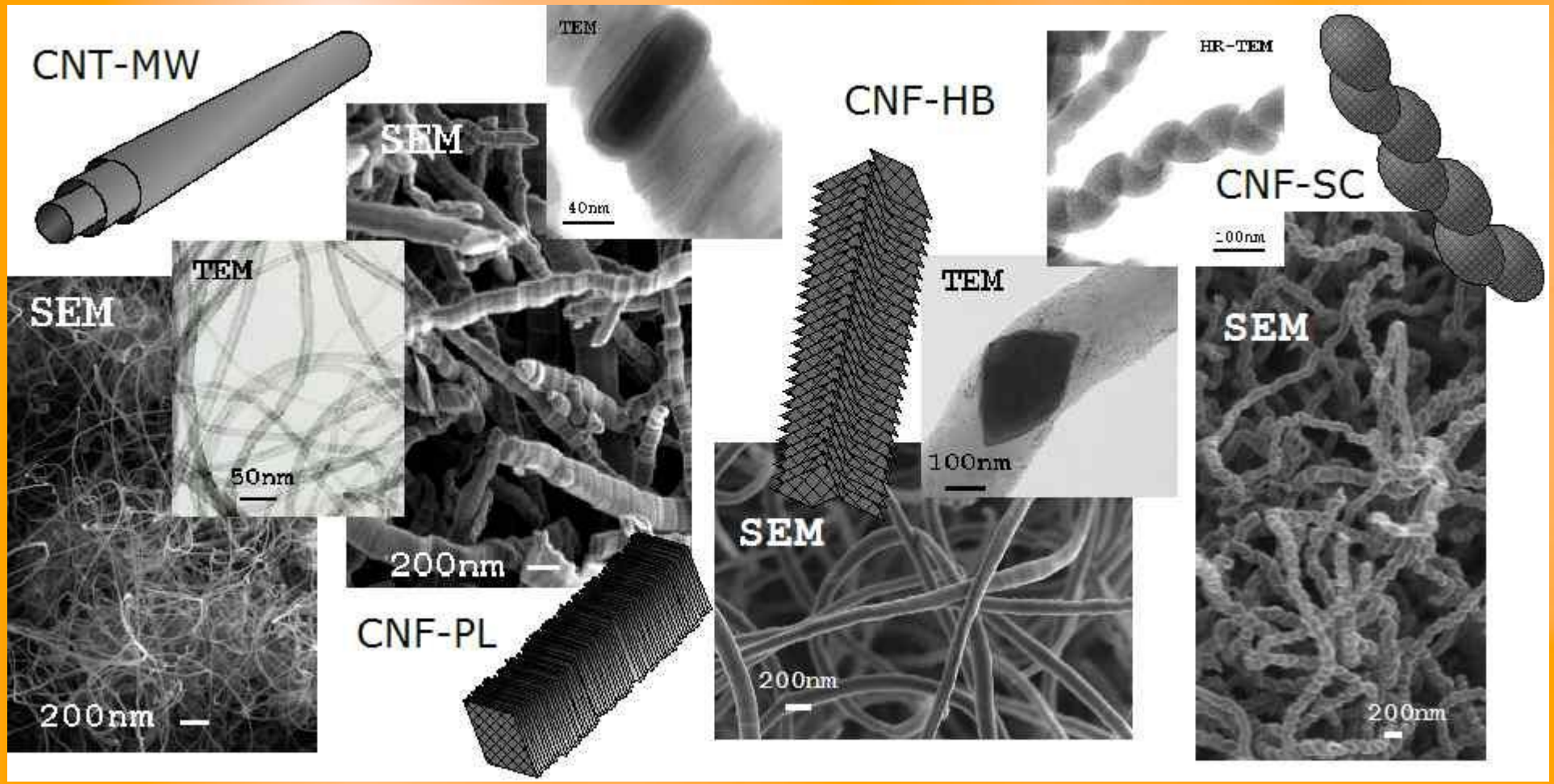
Battery Technology
high performance matrix material for Li-Ion batteries as coadditive to graphite. Large market potentials e.g. for automotive and portable application

Catalysis and Fuel Cell Technology
Metallised carbon nanofibers and carbon nanotubes increase the chemical activity of catalysts e.g. in chemical syntheses or fuel cells. Reduction of precious metal content, use of metallisation technology also for carbon-metal-composite materials

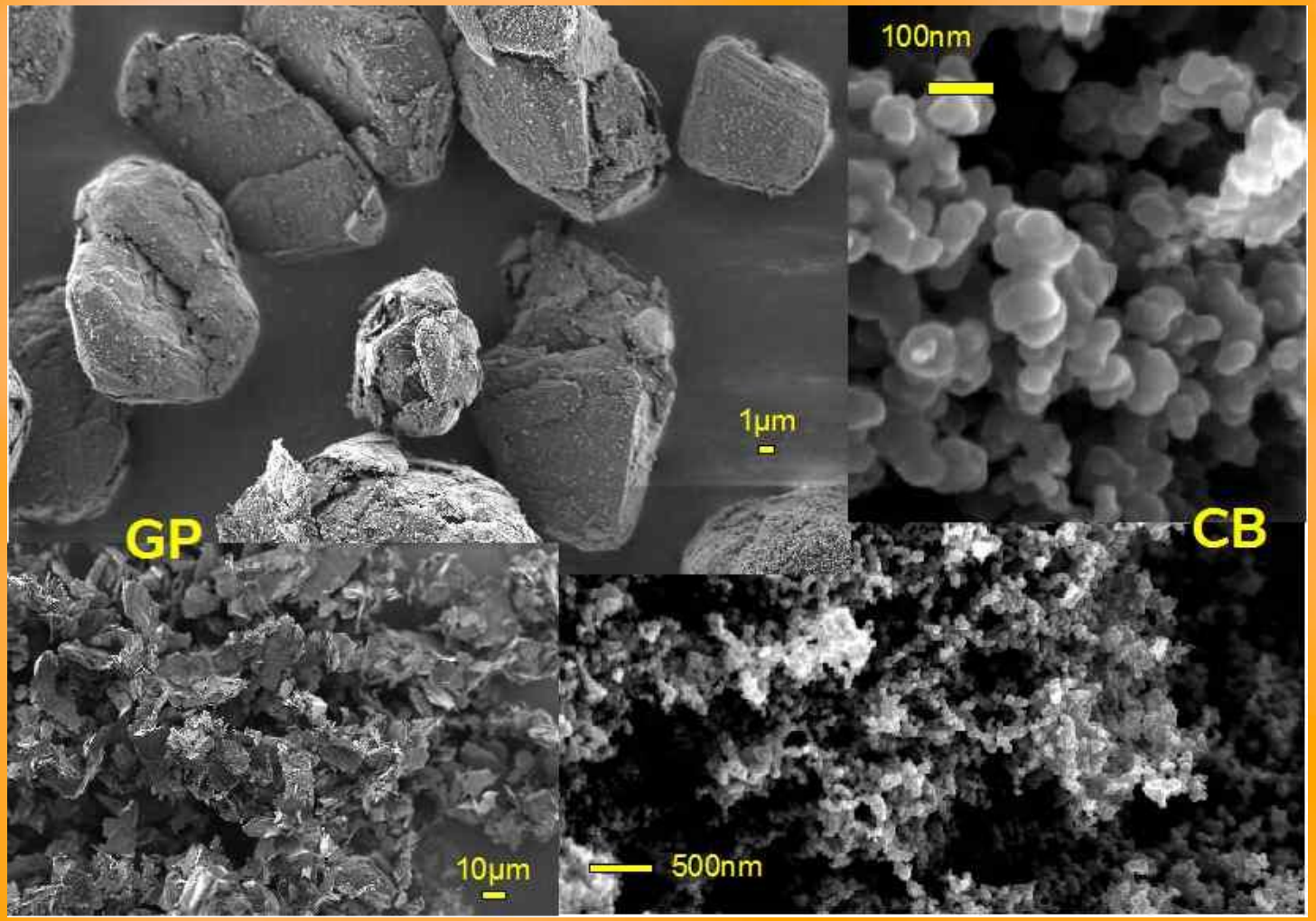
Gas Storage
high performance material for efficient storage of hydrogen and other gases e.g. storage of hydrogen for mobile applications

New Materials and Composites
nanocarbon containing semi finished products for the manufacture of composite materials based on polymers, ceramics, metals and carbon with enhanced mechanical, thermal and electrical properties.

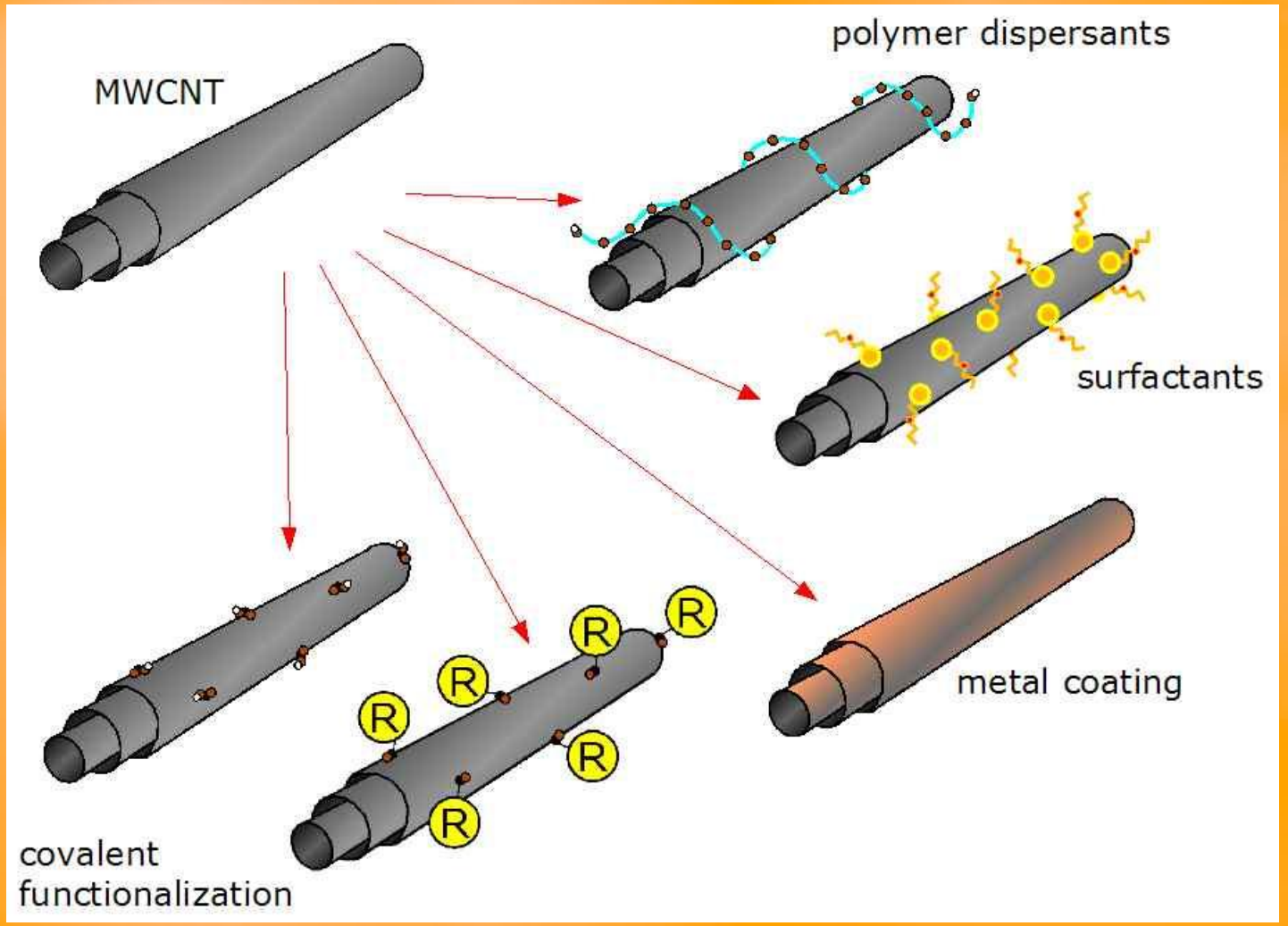
Carbon Nanofilaments



Other Carbon Particles

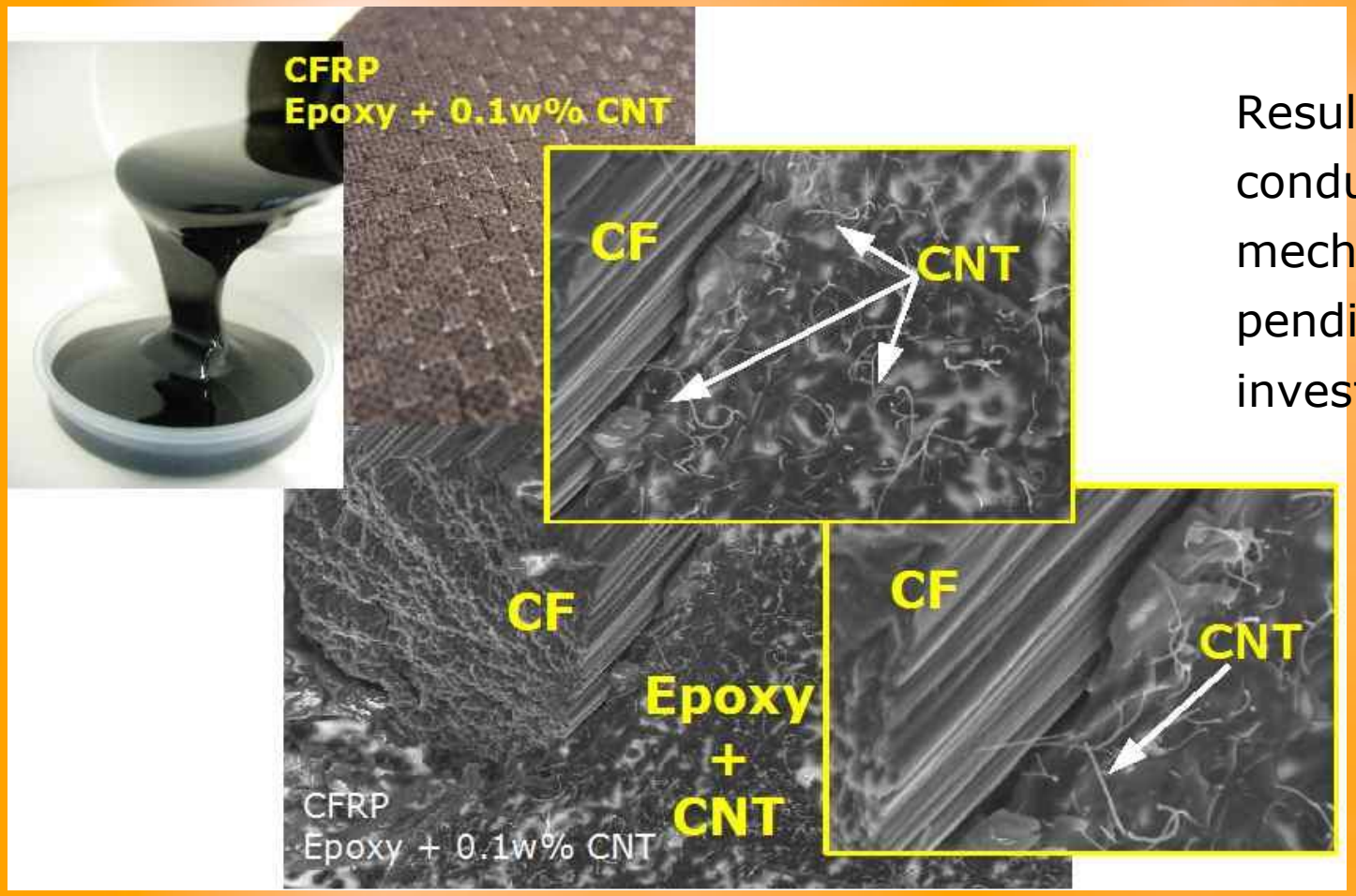


Modification



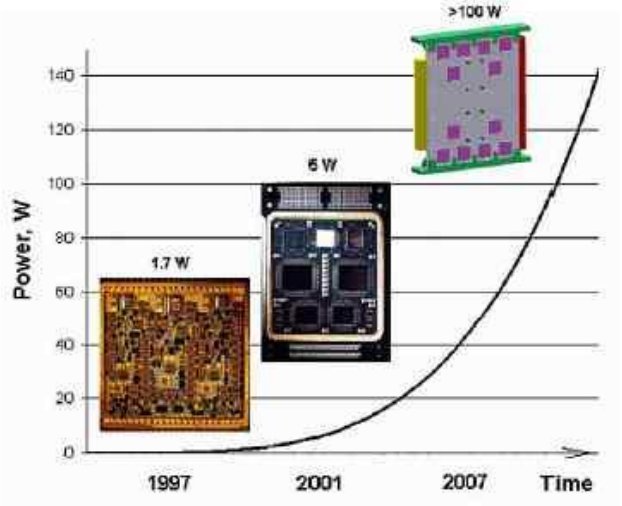
POLYMERS

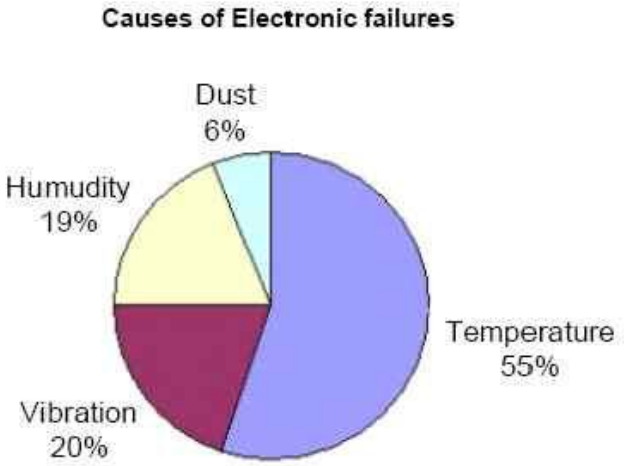
Epoxy

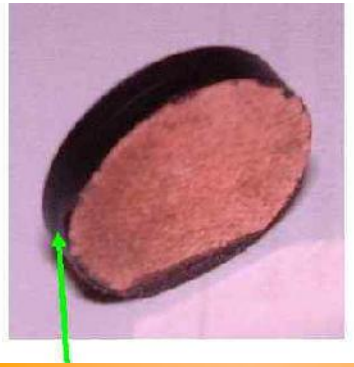


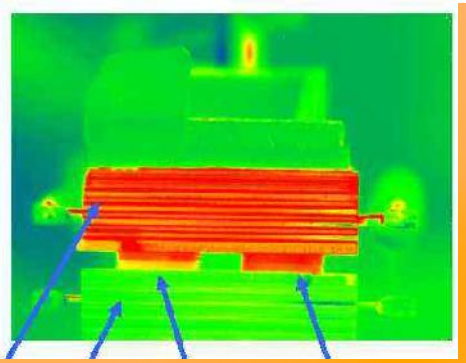
Results on electrical conductivity and mechanical properties pending further investigation

Thermal Dissipation: NANO *(20340/06/F/VS)*



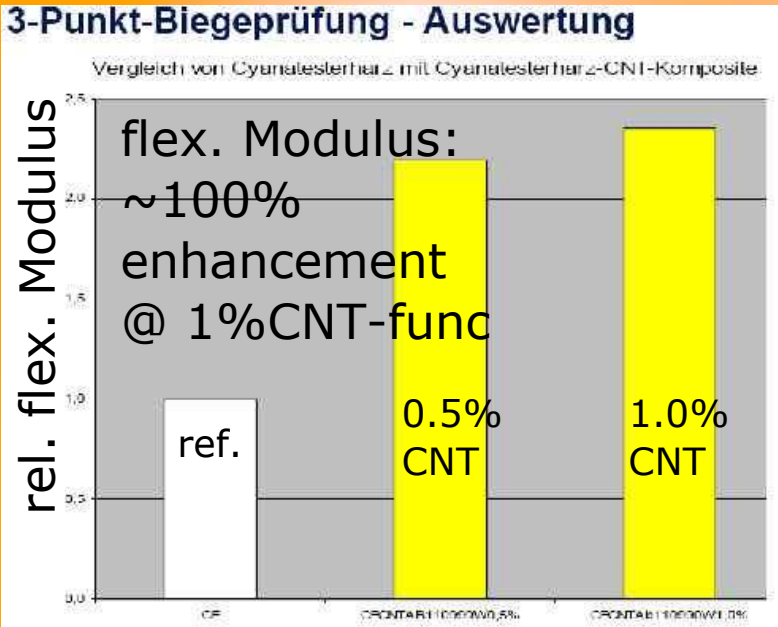


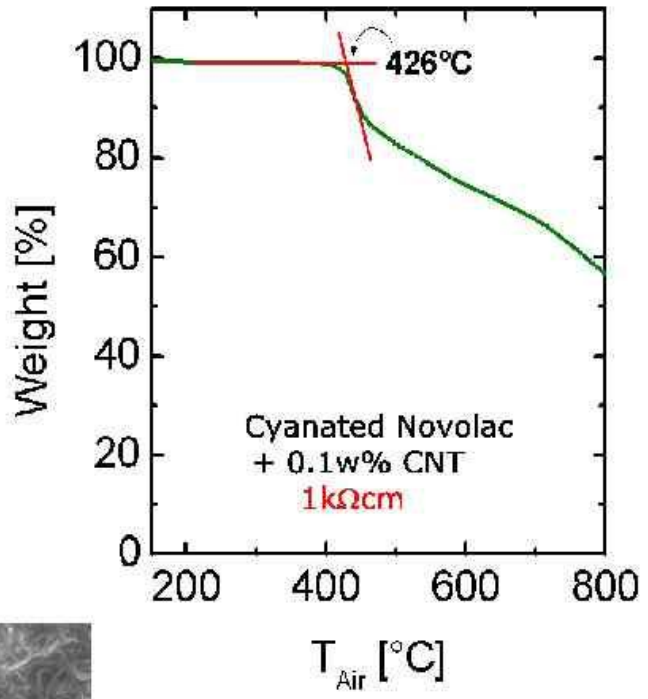




Development of thermally dissipative adhesives on epoxy basis

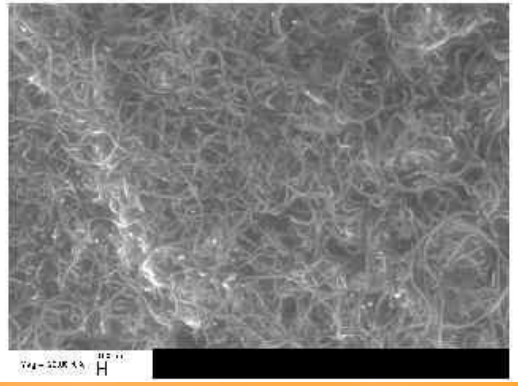
Cyanate Ester





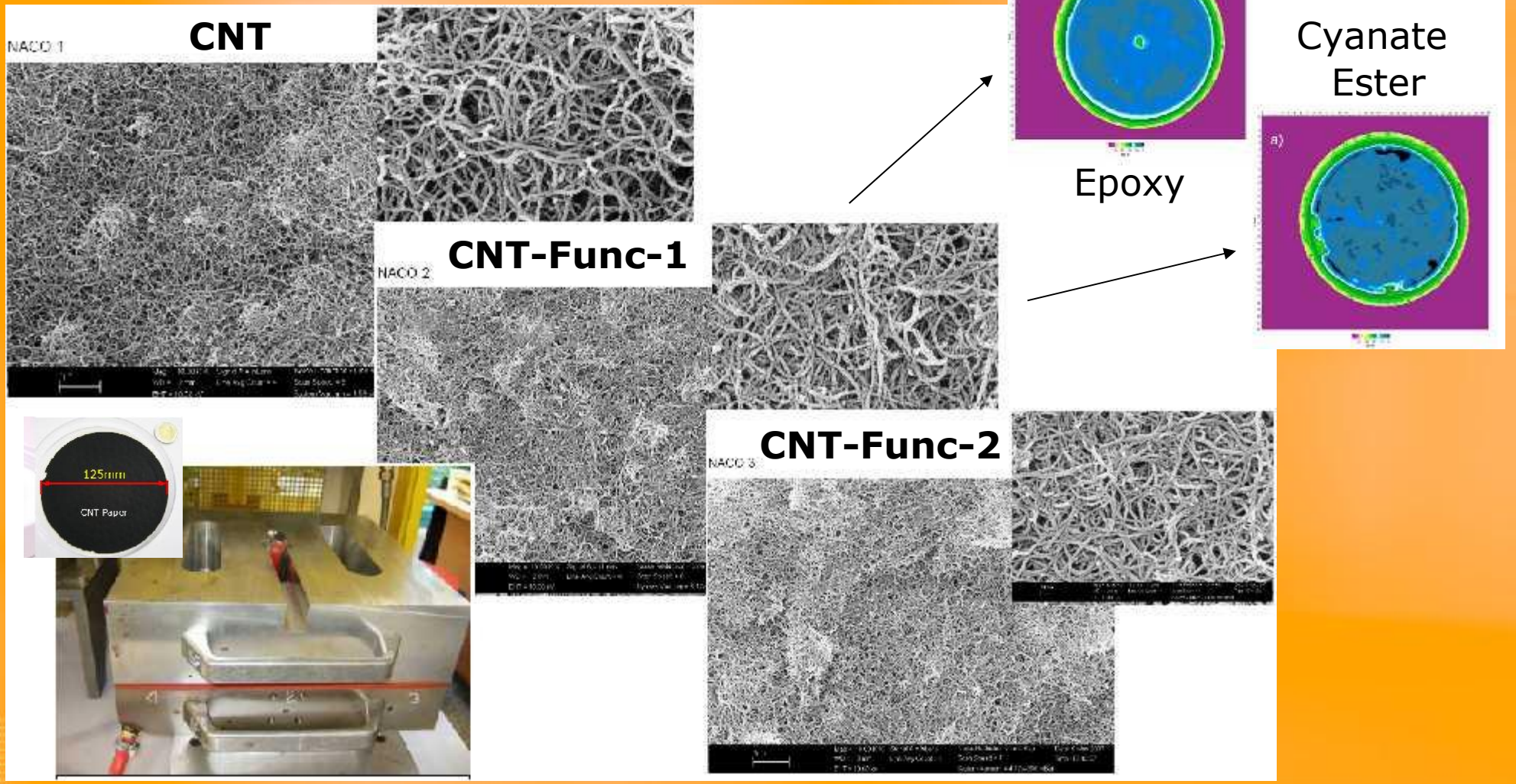
CFRP:
interlaminar shear strength enhanced by 50% @ 1%CNT

further investigations ongoing



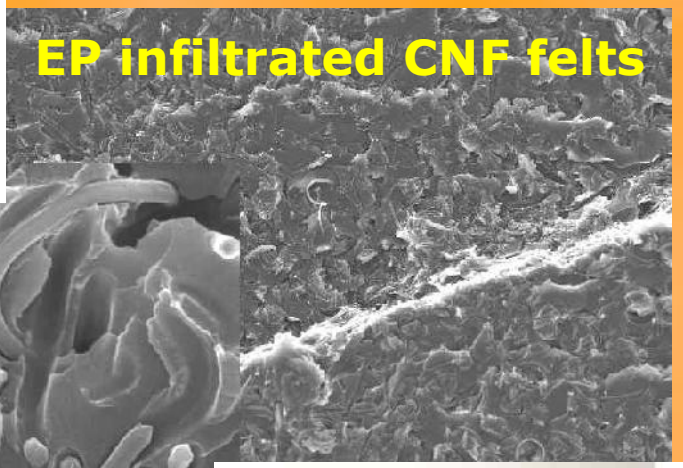
CNT-Paper infiltrated with resin
15% CNT

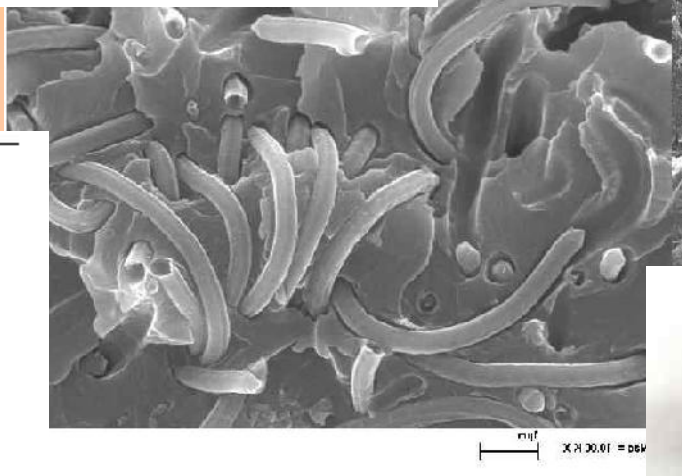
Resin Infiltrated Felts: NACO *(20521/06/NL/SFe)*

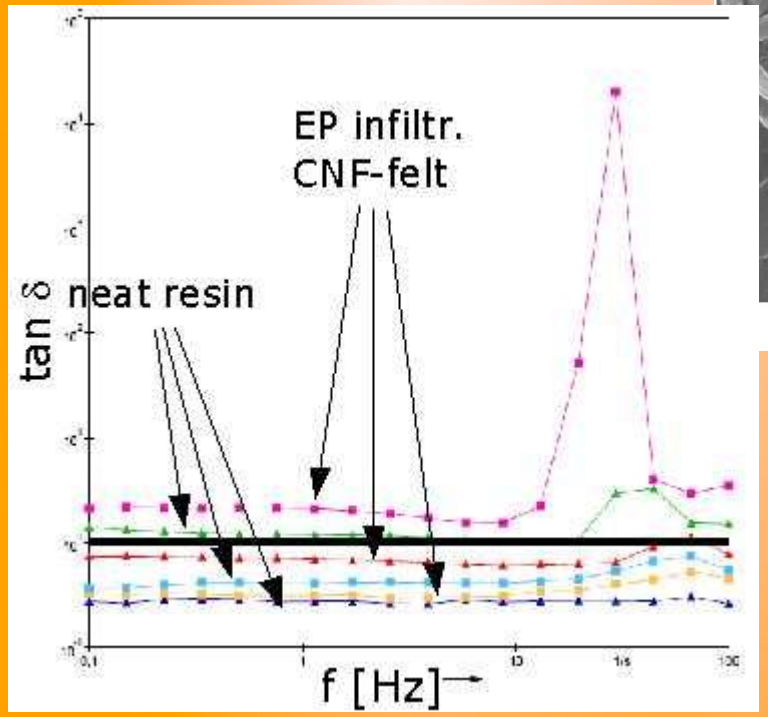


Flexible Felts (1-4866/05/NL/JMD)

flexible CNF felts





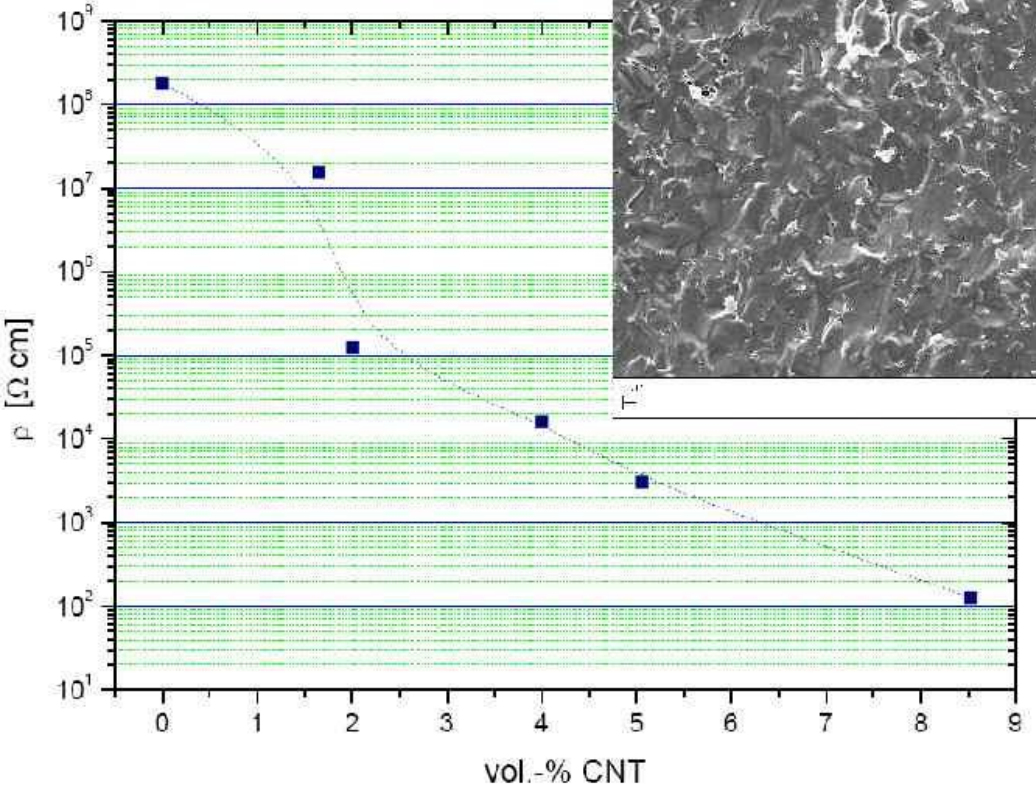


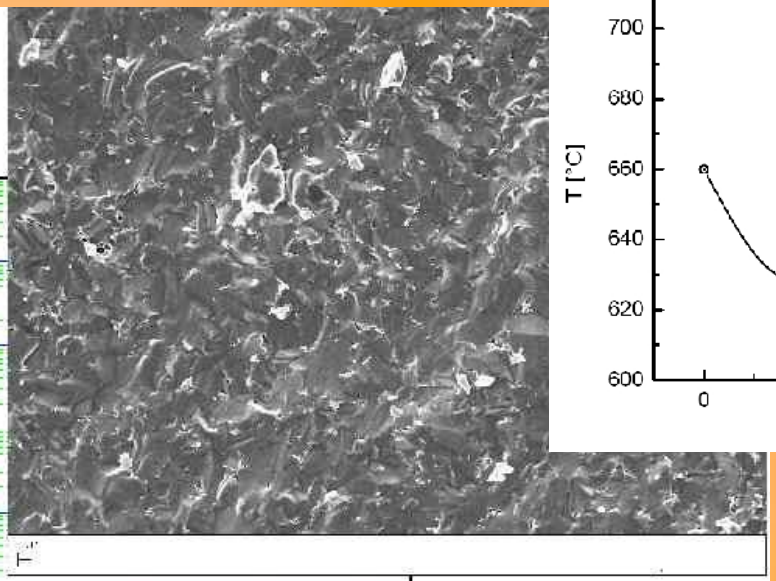
High performance
structural parts

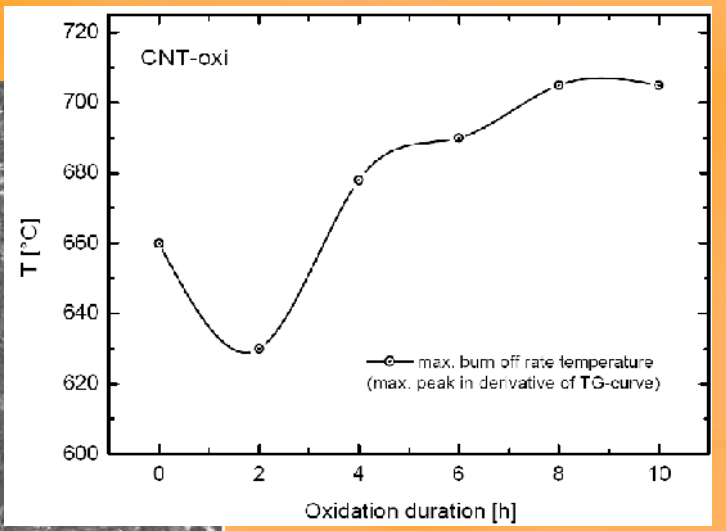
CERAMICS

Ceramics: CNTM (19128/05/NL/PM)

SiC

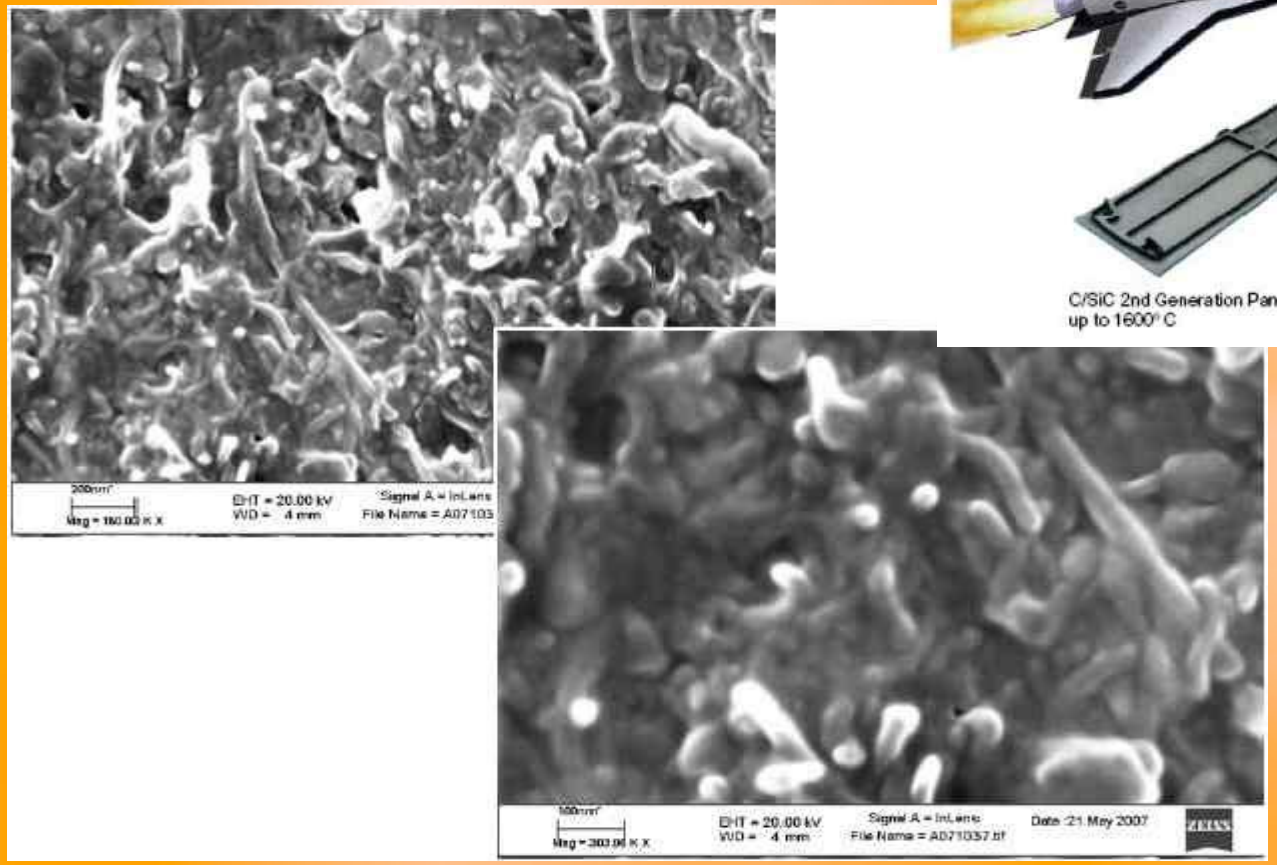






fracture toughness:
enhancement by ~20%
@ 4%CNT
electrical conductivity:
maschining by elektroerosion
becomes possible

Precursor Ceramic: NACO *(20521/06/NL/SFe)*



Improvement of:

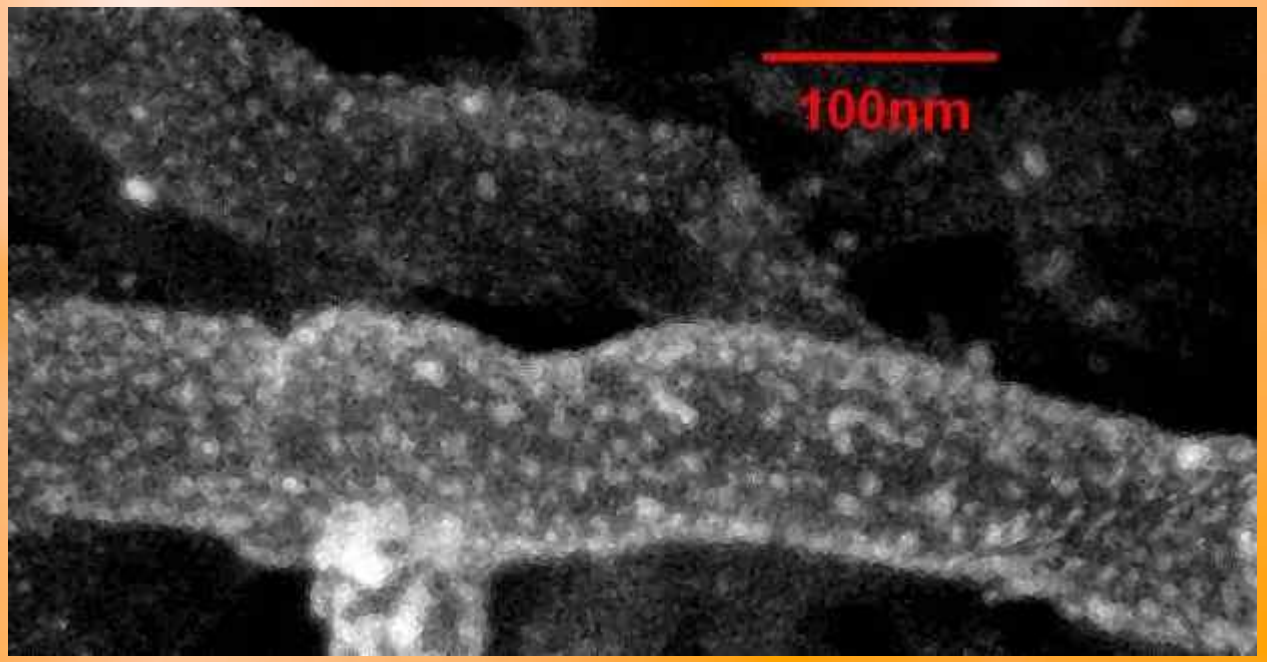
- Hot Self-supporting Hot Structures
- Hot Elastic Seals and Springs
- Hot Ceramic to Metal Fixed Joints
- Hot Ceramic to Metal Dynamic Hinges for temperatures up to 1650°C and shorttime even higher

Metals

Microwave Coating

_ Metal-CNX Composite materials: CNX + Mg, Cu, Ag

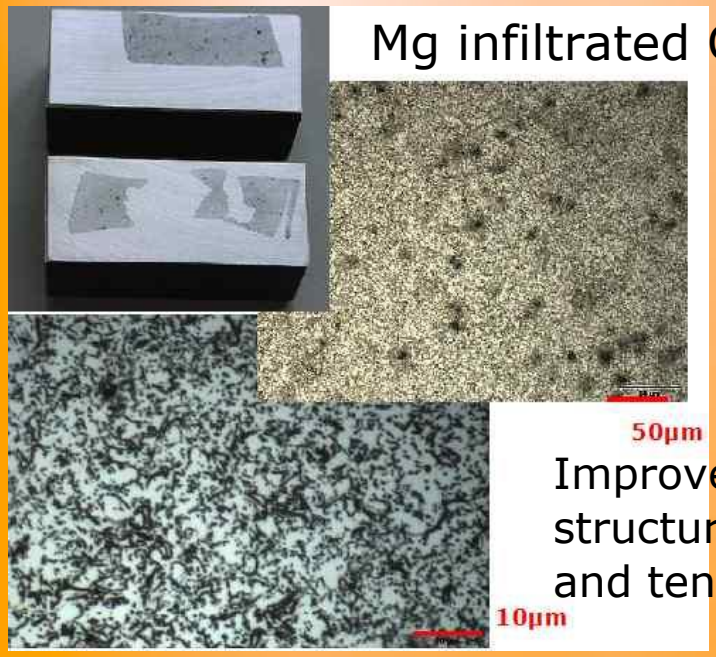
_ Catalyst materials: CNX + Pt, Ru, Pd, Au



Example: Pt on CNF-PL for use as PEM Fuel Cell Catalyst

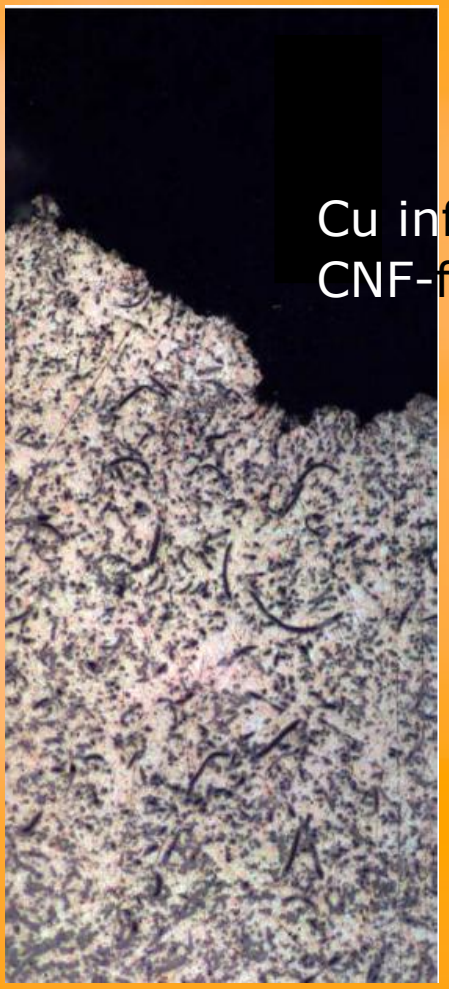
Powder Metallurgy and Infiltration Techniques

Cu + CNT powder
50:50 vol-%



Mg infiltrated CNF-felts

Improved micro-structure, hardness and tensile strength



Cu infiltrated CNF-felts

Acknowledgements

- CNTM-Team: HPS, Boostec Industries, Cirimat, Astrium Neue Materialien Würzburg, FH Nürnberg, TU Vienna, SUPSI
- -NANO-Team: HPS, RHe Microsystems, Kayser Threde
- -NACO-Team: ARC, Astrium, DLR, INEGI, PIEP, Uni of Patras, Electrovac

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