

Technovár Ltd., Hungary



*Nanolayer coating on
iron/copper particles for PM
productions*

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National Office for Research and Technology

Established by the support of the National Office for Research and Technology.

CORNET Győr, 14. January 2010

Project proposal

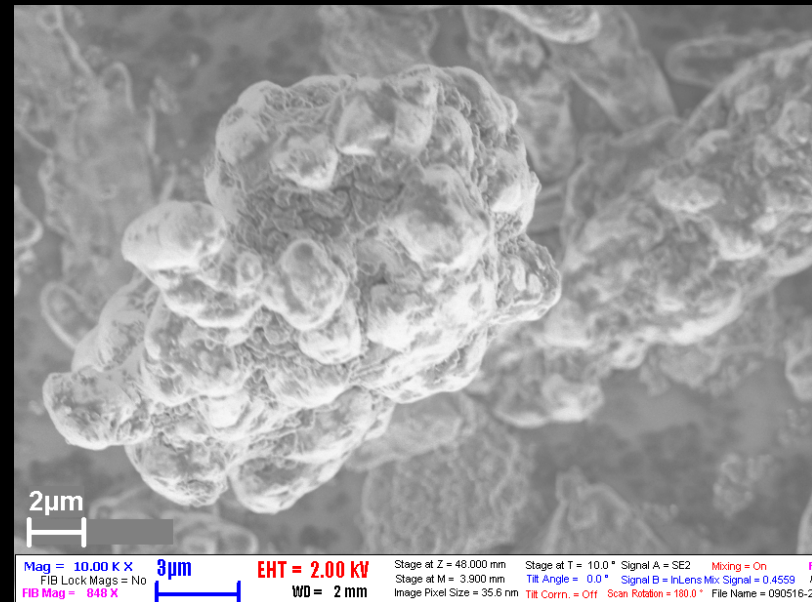
- **Powder Metal (PM) parts producing technology** for automotive, household machines, electric motors etc.
- The novelty of the PM technology is the being the nanoparticles inside the parts.
- The forms of nanoparticles are partly layers, partly fibers.

Properties of the parts

- **electrical**
 - * changeable resistivity
 - * electric insulating
 - * keep the electric insulating ability up to 600 C°
 - * low cost substrates
- **mechanical**
 - * reinforced connection
 - * no or lower porosity
 - * ceramic like hardness
 - * flexibility
 - * sock resistant
 - * better thermal conductivity

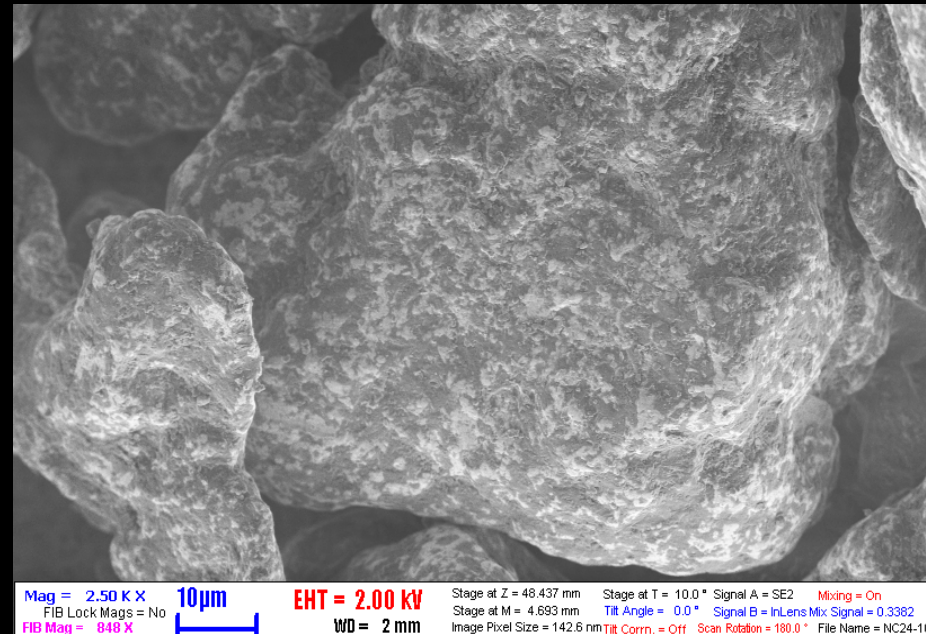
The basic substrates

- For copper based parts
 - * copper powder
 - * ceramic nanopowder
 - * embedding the nanoparticles into the copper surface
 - * slipper (Zn stearat)



The basic substrates

- For iron based parts
 - * iron powder
 - * ceramic nanopowder
 - * embedding the nanoparticles into the iron particle surface
 - * slipper (Zn stearat)

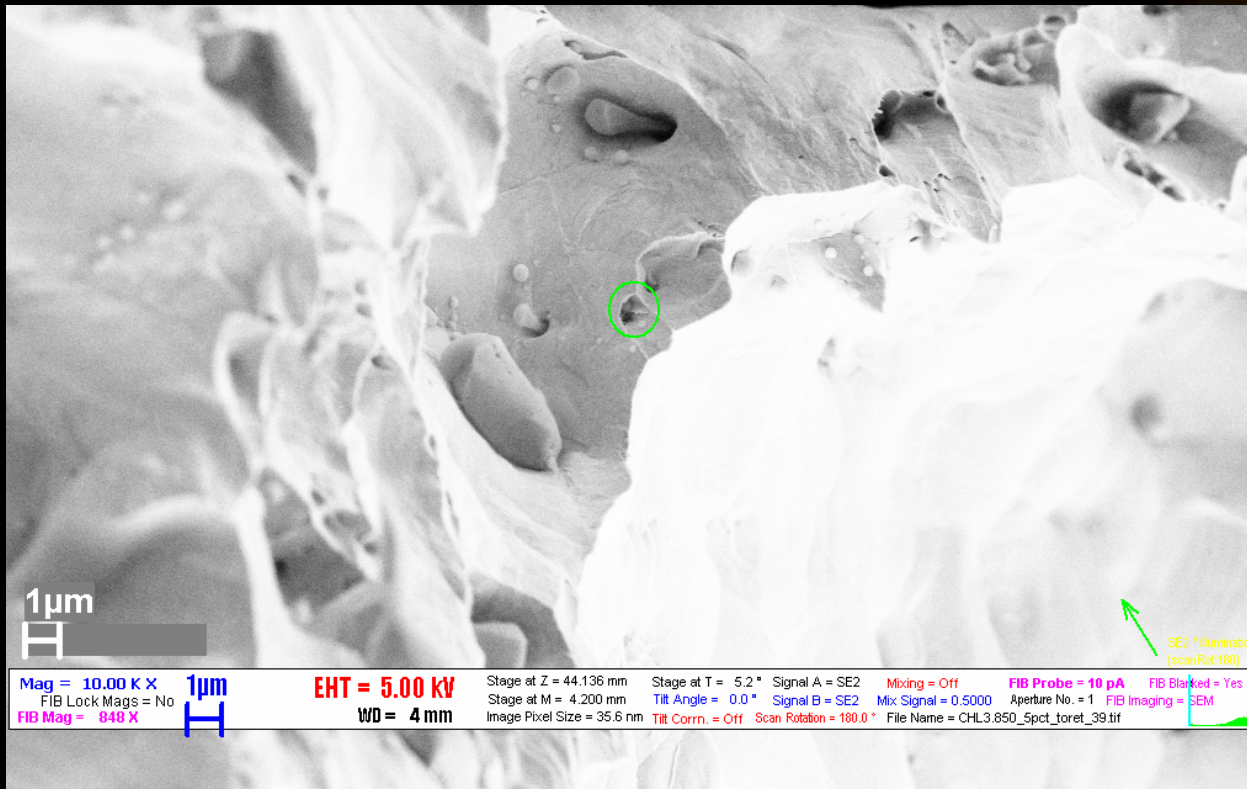


Technological process

- Traditional technology
 - * slipper (lubricant) adding to the powder
 - * pressing
 - * sintering
 - * finishing
- Hot technology
 - * slipper does not need
 - * hot pressing

The structural results

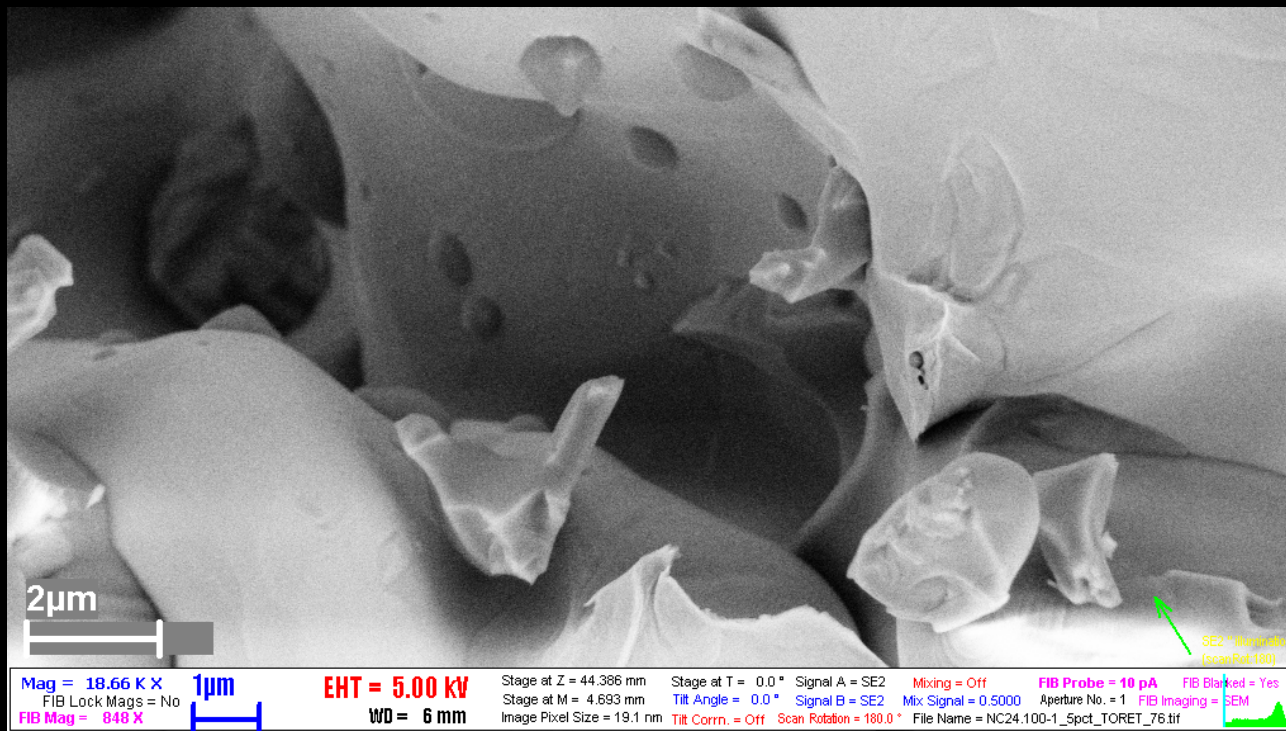
- At copper base parts



- Cracked fibers
- Layer on the particle

The structural results

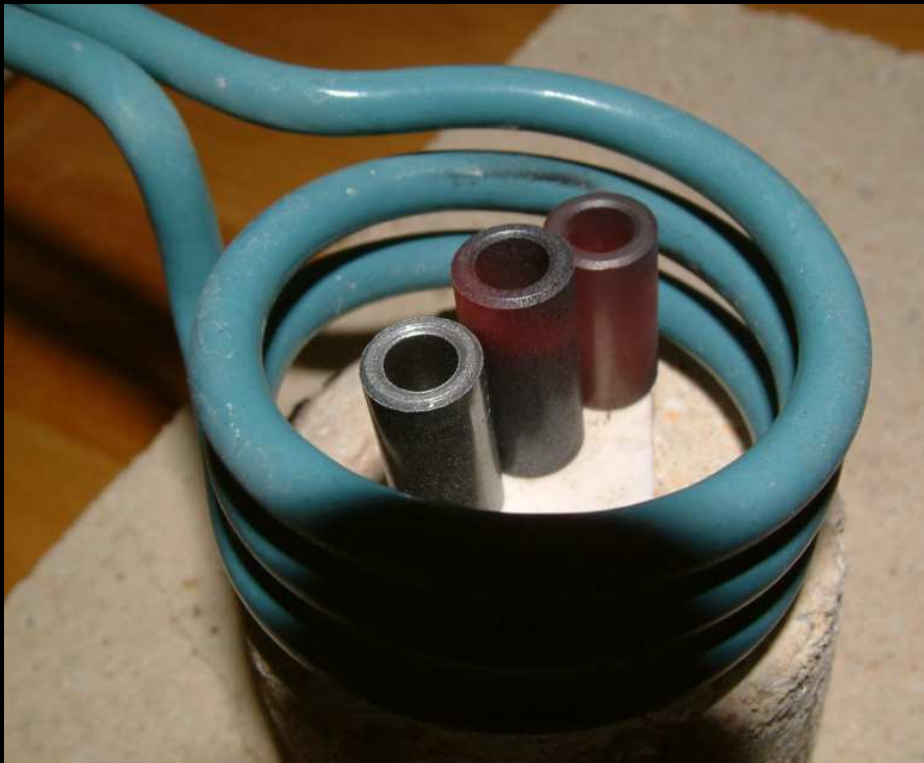
- At iron base parts



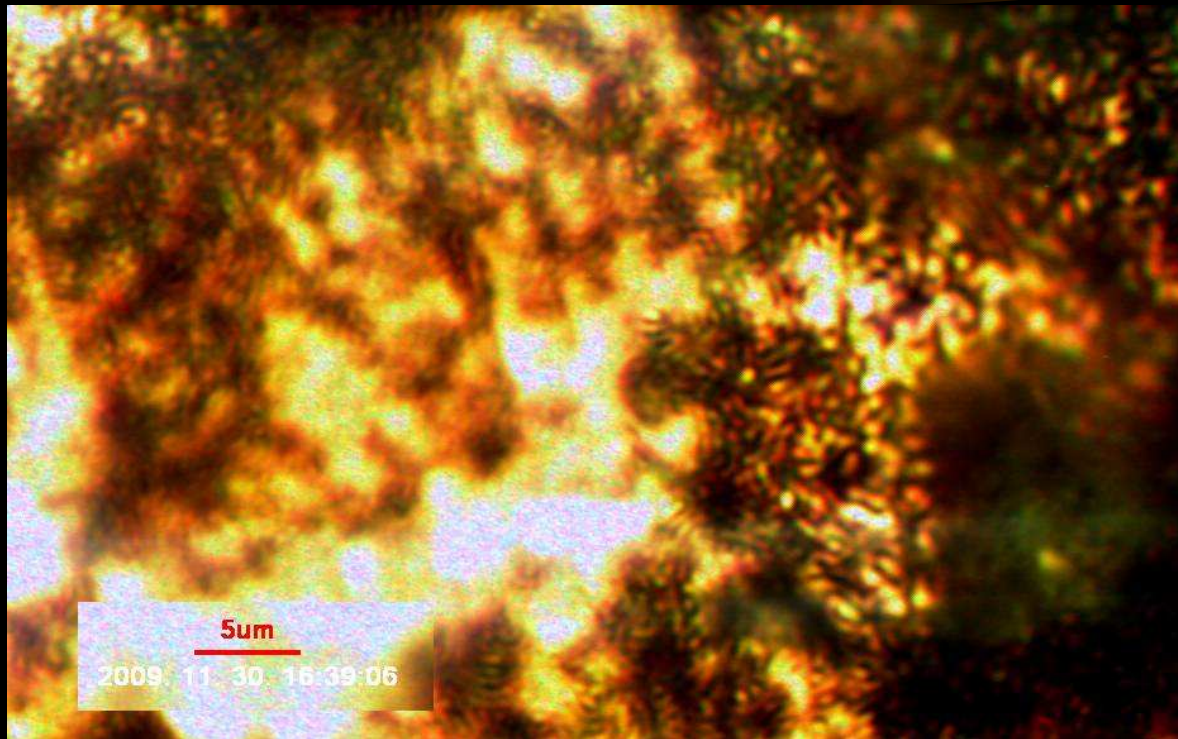
- Cracked fibers
- Layer on the particle

The functional result

- The electric resistance
- The electric resistance changeable by the quantity of ceramic content
- Eddy current level depends on the ceramic layer's thickness



Fiber network in copper matrix



Application samples

- Bushings/yokes
- Motor core parts

