HEF GROUPE | Surface materials engineering

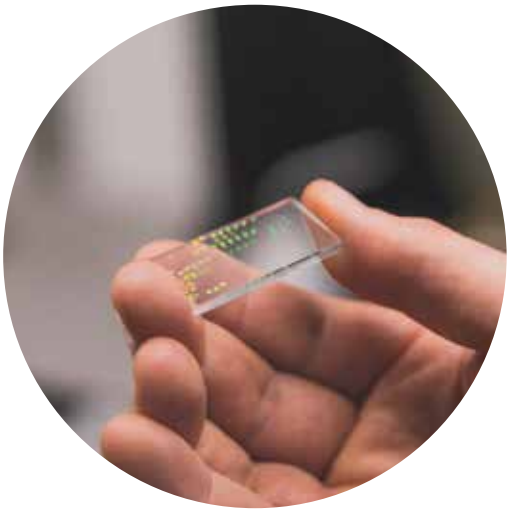
Ultra-fast laser treatment and smart powders

LASER TECHNOLOGY

Main advantages:

Ultrafast laser processing allows for functionalization, texturing or micromachining through rapid processing, without material deterioration, in both 2D and 3D on all your materials.

- No thermal effect
- No deformation
- Ablation down to the micron
- Clean cutting edge
- Extreme precision
- Not material dependent



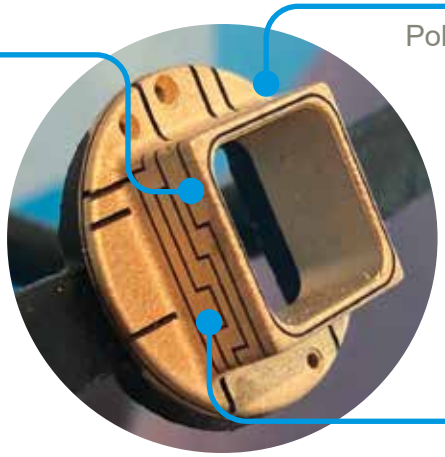
HEF capabilities:

13 Laser platforms

- **10** Femtosecond laser sources up to 300w
- **2** 6-axis robots
- **1** Additive manufacturing machine
- **2** Other laser sources
- **1** Mobile industrial demonstrator
- **6** Stage environments up to 600x800mm

Industrial Applications

- Cutting/Drilling/Dicing
- Ablation of thin layers
- Etching
- Micro & Nano Surface Texturation



Materials

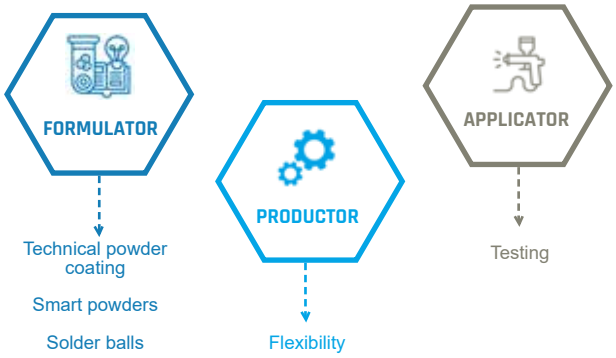
- Polymer (PET, Parylene, PTFE...)
- Metals (Aluminium, Gold, Copper, Nickel, Tungsten...)
- Composites
- Ceramics

Functionalization of your surfaces

- Hydrophilic / Hydrophobic
- Anti-icing
- Sealing
- Enhancement
- Absolute black, anti-reflective
- Roughness modification
- Wettability (adhesion, surface preparation)
- Tribology (reduce friction and wear)

SMART POWDERS: THREE FAMILIES

1 TECHNICAL POWDER COATING

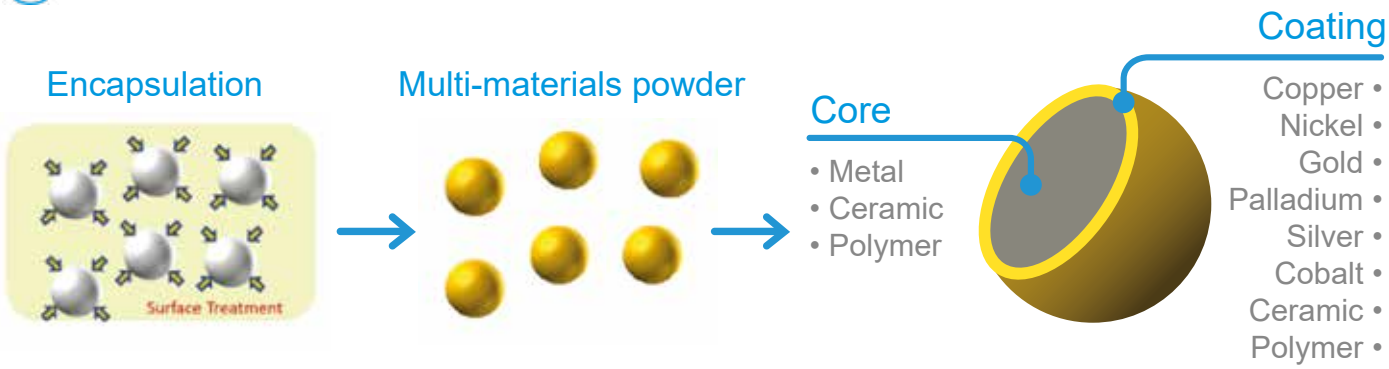


Range of technical powder coating*:

- Electrical and thermal conductivity properties
- Low polymerization temperature from 110°C
- Dielectric and/or flame-retardant properties
- High chemical resistance
- Decorative applications

**We offer translucent protective varnishes applicable to our technical coatings.*

2 FUNCTIONALIZED POWDERS



Main advantages

- Ease of use
- Homogeneous distribution
- Control of the coating composition
- Control of the microstructure

Main Properties

Usable in your material matrices

- Hardness
- Lubrication
- Conductivity
- Diffusion barrier
- Anticorrosion
- Wettability

CUSTOM SPECIFICATIONS ACCORDING TO YOUR NEEDS

Multi core/coating configurations

- Ceramic / metal
- Metal / metal
- Polymer / metal
- Multi layers

Any kind of morphology Wide range of grain sizes

- Flakes
- Fibres
- Sphere

Application areas:

Composite materials:

- Charged polymer
- Smart fillers

Coatings:

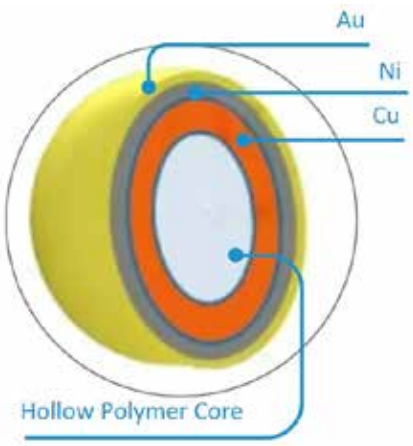
- Thermal spray
- Cold-spray

Sintering:

- Powder metallurgy
- Additive manufacturing
- Injection (PIM,MIM)

3 POLYMER CORE SOLDER BALLS

General Information:



- Alternative to traditional non-collapsible lead solder balls
- Minimize mechanical stress
- Improve reliability and reparability
- Compatible with solder reflow according to IPC-J-STD-001
- Miniaturisation
- Flexible design with different possible coatings
- Excellent corrosion resistance with extended shelf life
- Can be mounted using ICA or solder paste (lead-free compatible)
- Controlled stand-off height (+/-5%)

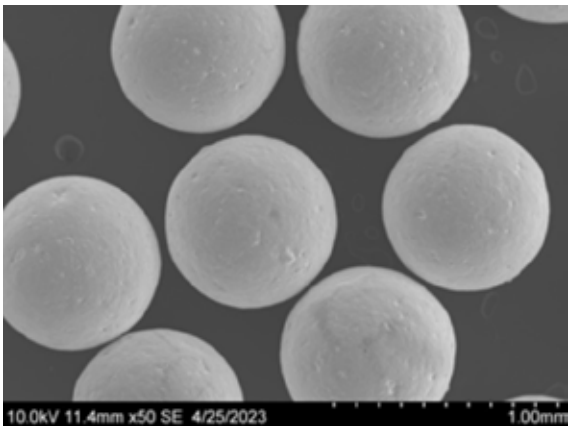
Polymer core solder balls help improving the lifespan of electrical contact for assembling BGAs on a printed circuit board

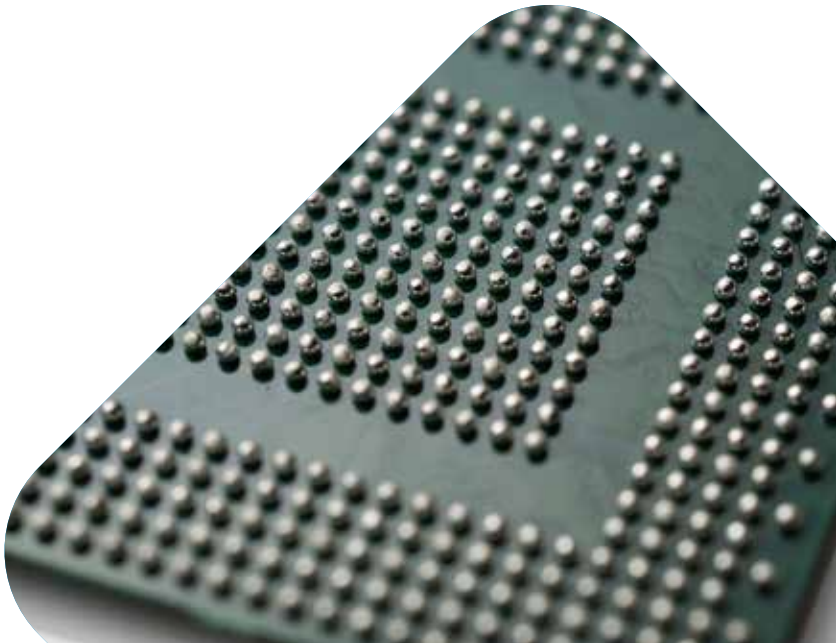
Technical Data:

Ball size from 280 µm to 750 µm +/- 5%

Coating design*: from 50 nm to 20 µm	**Cu Ni Au**

**Other possible configurations on demand*





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