LPBF of CuCrZr parts: processability, microstructure, mechanical and thermal performances

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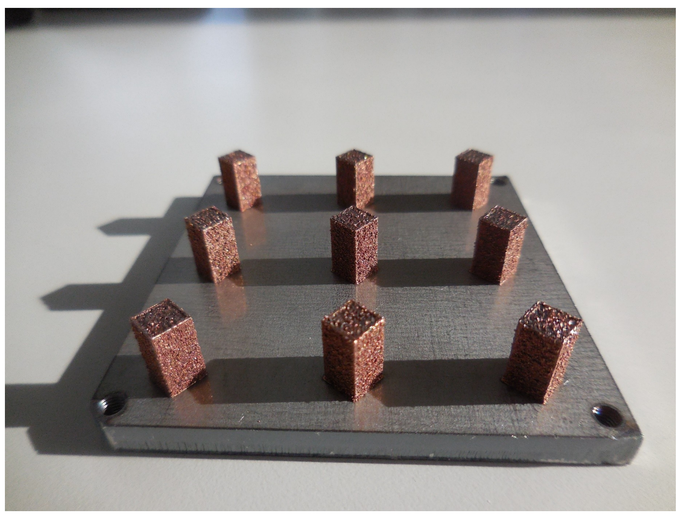
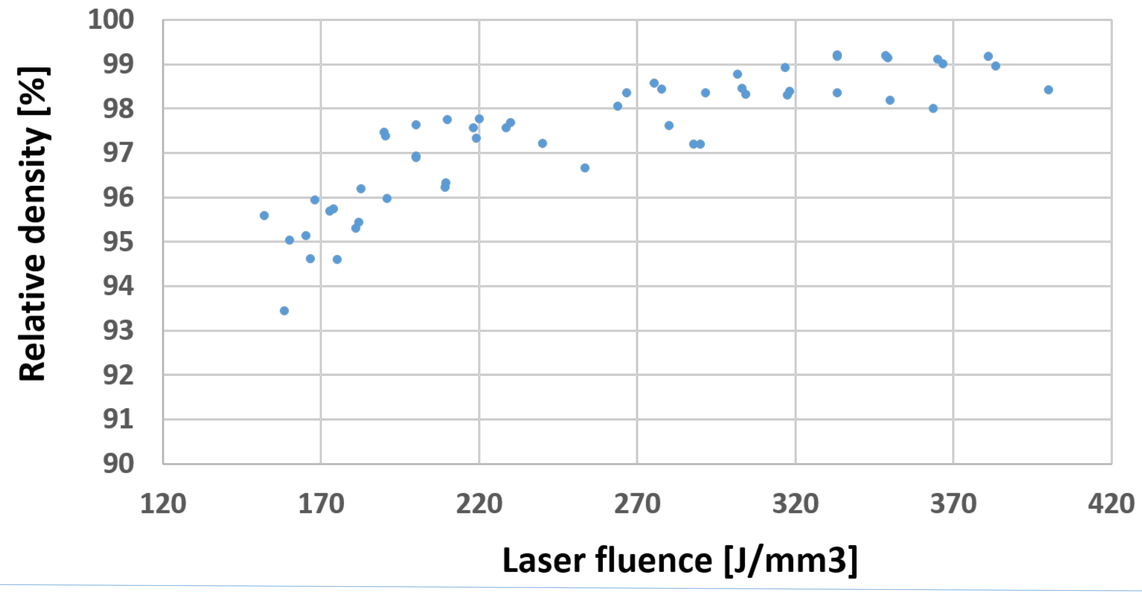
LPBF system (mod. MetalOne*), equipped with a 1kW fiber laser, was realized for printing high reflective materials, like copper based powders.

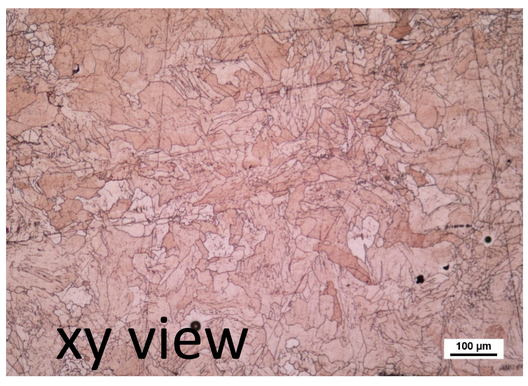
1) Processability of CuCrZr powder

Cubic full dense samples were built. The process optimization was carried out for maximizing the relative density (up to 99.3%).





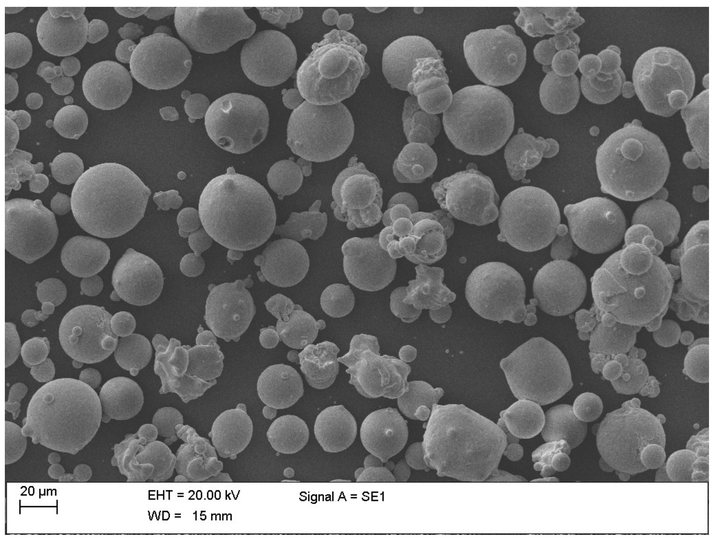
2) Microstructure of CuCrZr as built parts



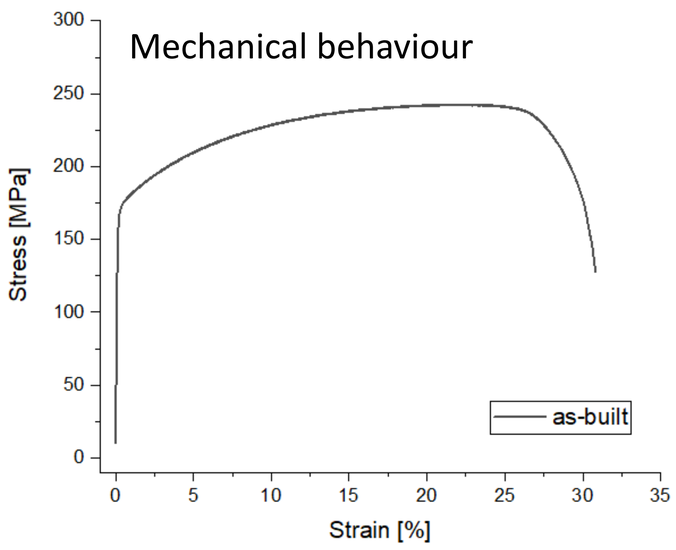
Columnar grains were observed, lying along the building direction (xz).

Spherical CuCrZr powder, whose chemistry reported in the table, was used.

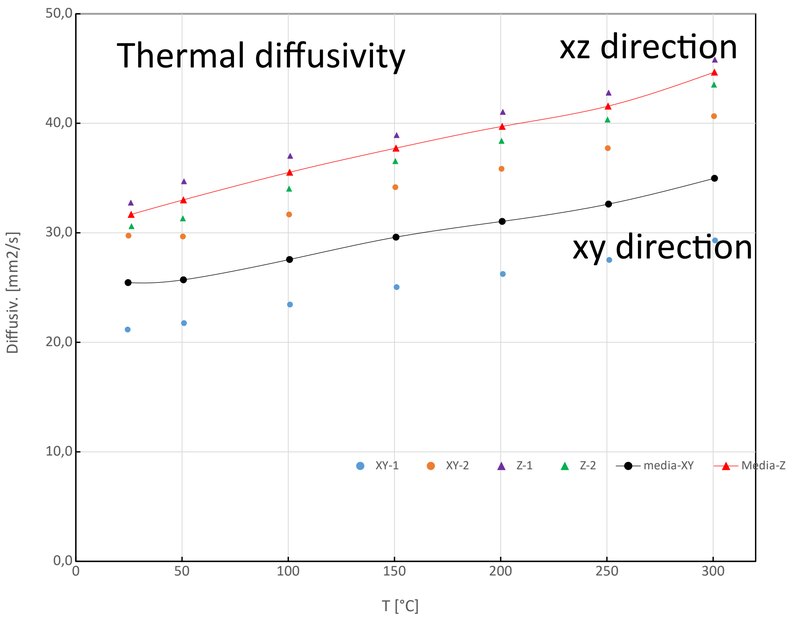
Cr (wt.%)	Zr (wt.%)	Cu (wt.%)
0,5-1.2	0.03-0.3	Bal.



3) Mechanical and thermal behaviour of CuCrZr as built parts



Elongation to failuire is 30 % in strain. This value confirms limited residual defects in the 3D parts.



Thermal diffusivity is infleunced by the printing direction.

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