

Questions and discussion 3

Why carbon phosphate makes porcelain harder? *Simon*

The chemical reaction that leads to this hardening are complicated and not well understood.

Do synthetic particles always adopt round shape? *Meryem*

Not necessarily, particles can undergo milling which lead to irregular shape or even some manufacturing process don't produce spherical synthetic powders.

How do we get a ceramic from a powder? *Alexis*

i.e porcelain: - mixing of the 3 powders

- suspension in a solvent

- forming technique

-drying

- removal of additives

- sintering

-finishing

(the whole process is further developed during the next lectures)

Thermal decomposition is one of the process to create a powder which are the raw material of ceramic manufacturing

Does ceramic with covalent bond are harder than ionic one? *Meryem*

In general, yes since it takes more energy to breaks covalent bonds. But this hardness come with a price, the sintering energy is also higher meaning high sintering temperature, the covalent bond is non-polar meaning that those powders cannot be suspended in water, the hardness of those ceramics makes them very hard to machine so it must be shaped before sintering taking the shrinkage into account. The sintering can also be done with other techniques such as spark plasma sintering, liquid sintering or additive manufacturing.