Questions and discussion 6

Why Yttrium stabilized zirconia has a good fracture toughness? *Amandine*

The addition of a small amount of Yttrium in zirconia allows the stabilization of the tetragonal phase at room temperature. Normally, at room temperature the phase diagrams predict the monoclinic phase, which is less dense than the tetragonal one, but the addition of yttrium changes the kinetic of this transition. Without Y, the transition occurs at over 1000°C, at this temperature the atoms are very mobile at the transformation is possible: But with a small amount of Y this transition is shifted towards lower T (i.e slide 24 semaine 6) at which the atoms mobility is too low for the transition to happens, the material is "kinetically frozen". *Meryem*

And it is this stabilization of the denser tetragonal phase at room temperature that allows this good fracture toughness. Whenever a crack develops inside the material, since cracks are high energy region and there are empty spaces there is a phase transition and monoclinic (less dense) phase can fill the crack that therefore cannot propagate and fracture the material.

What is liquid milling/ fluid energy milling? *Simone*

In this type of milling there is no ball that breaks the material but it is the collision between particles of the ground material that breaks them. It is well suited for brittle material and if we want to avoid contamination coming from the milling balls.

What is the meaning of the selectivity and the sharpness? *Nikohos*

Selectivity is a property of the classification method and is an indication of its accuracy and the sharpness tells us the quality of the sieve.

What can we do about the big particle that remains after a long milling? *Meryem*

Nothing, at the point we reach a milling limit meaning that we canno't decrease the size of those particles. But since that can have negative impact in our ceramic we can sieve them so they do not enter in our material.

+: Meryem, Patrick, Simone, Alexis, Dylan