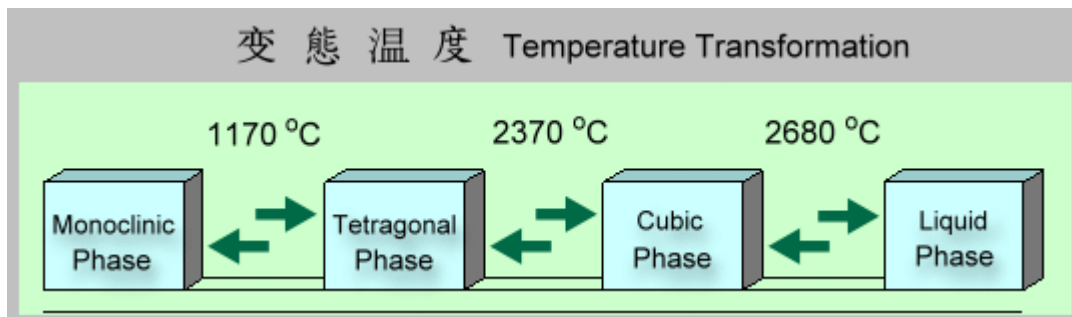


At room temperature, the mechanical strength & fracture toughness for Zirconia (ZrO_2) is the most powerful within all ceramic materials; therefore it has another appellation “Ceramic Steel”.

For pure Zirconia, the melting point is get up to $2680\text{ }^\circ\text{C}$, and the Vickers Hardness is about 1400HV (HR89). At different temperature, it has distinct crystal states which are high temperature of cubic phase, tetragonal phase and low temperature of mono-clinic phase.

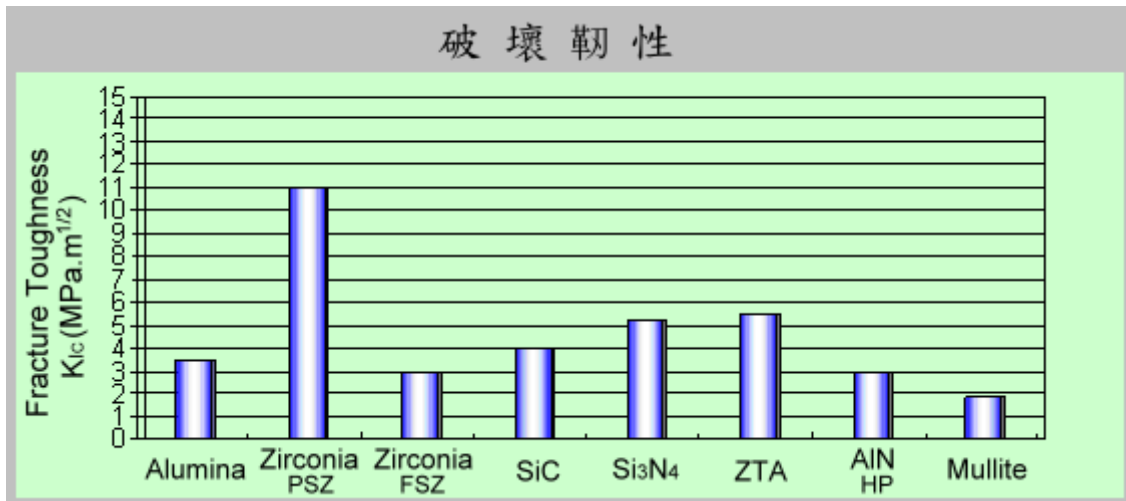


When the cooling process at about $1170\text{ }^\circ\text{C}$, the Zirconia's crystal is changing from tetragonal phase to mono-clinic phase, the pure Zirconia will be anisotropic volume expansion around 4~5%; it will be not to use caused by disruptive transformation.

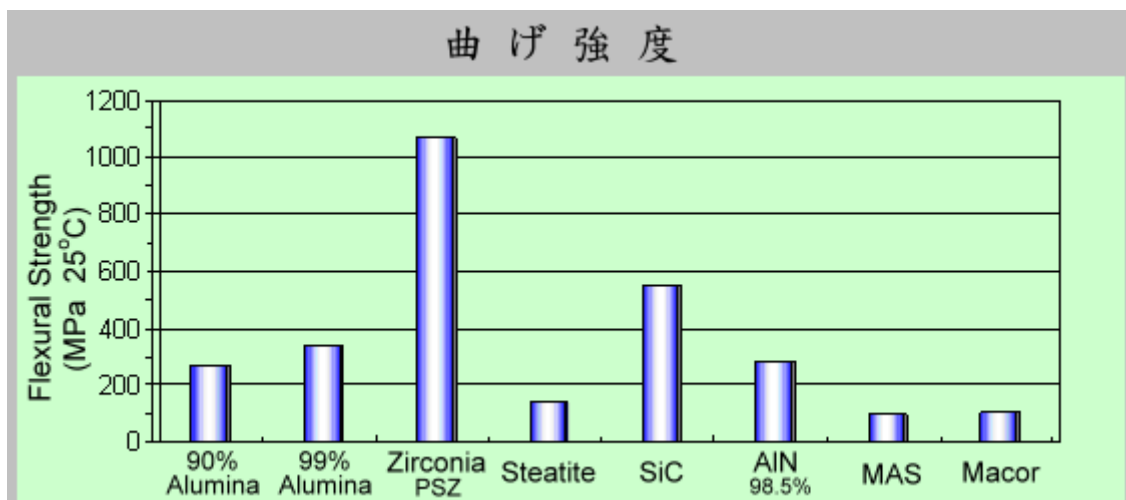
At that time, it can be adding different percentage of stabilizing agents such as MgO, CaO, Y_2O_3 or CeO_2 to control the crystal state. We mainly supply the Partially Stabilized Zirconia (PSZ) which are added 3~4 mol% of Y_2O_3 or 8 mol% MgO to make cubic phase & partial of tetragonal phase appearing the state of mixed coexistence.

When PSZ are be tensile or compressive strain by external force, its structure will be changing from tetragonal phase to mono-clinic phase, and it is similar with “Martensitic transformation” which is steel quenching caused. The unique phenomenon which is utilizing phase transformation to absorb energy and increase ceramic toughness, it's called “Stress-induced phase transformation” (SIPT).

Compared with the Full Stabilized Zirconia (FSZ) which is forming by 100% cubic phase, the PSZ's fracture toughness & mechanical strength are more. Its rate of fracture toughness is getting up to 9~11 MPa · m^{1/2} which is equal to 3 times the strength of Alumina's materials. Therefore, it conquered the defect of ceramic brittleness substantially, and made the structural ceramics be wide application.



Only two types of PSZ & TZP (Tetragonal Zirconia Polycrystal, 90% tetragonal phase, add yttria) can supply highly strength & toughness, it mainly applies in the structural components which are requested wear-resisting & highly mechanical strength. At room temperature, its wear rate is higher about 3~5 times than Alumina. But, the mechanical strength is lowered at high temperature; for this reason, PSZ & TZP are not applying to the environments of high temperature structure.



FSZ (completely 100% cubic crystal) added much of stabilizing agents for Ca^{2+} , Mg^{2+} or Y^{3+} are solid solution in ZrO_2 to lower the electronic resistance at high temperature; and it has electric conductivity at over 500°C therefore it can make gas of high temperature measuring.

And, it can apply in Oxygen Sensors because it has the character of ionic conductor which is Oxygen vacancies caused.

Besides, it can be used the low thermal conductivity to make high temperature of refractory materials. (We have no above two kinds of parts)

FSZ also has the character of excellent chemical stability; it can resist the corroding of almost acid & alkali substance except Hydrofluoric acid (HF). And also, it is stability for melt metal. Therefore, it can make the crucible for metal melting, too.

Zirconia can supply high strength, fracture toughness and hardness; hence it has excellent wear-resisting and is a perfect of advanced structure parts.

Mainly Characters:

High Density
High Mechanical Strength
High Fracture Toughness
Wear-Resistant
Self Lubricating
Non-Magnetic
Low Thermal Conductivity

Mainly Applications:

Abrasion Resistance Parts
Seal Rings
Wire Guides
Pump & Valves Parts
Ceramic Crucible
Grinding Media
Bearing, Rotating Parts
Screw and Nut

If your company has the demand for the Zirconia, we are willing to receive your sketch. We will provide the satisfactory, excellent quality and reasonable price of precise parts for you.