

## USE OF KYANITE AS REFRACTORY RAW MATERIAL

Kyanite is one of the Alumino-Silicate group of minerals comprising Sillimanite, Kyanite, Andalusite, Dulmortierite, Topaz and Mullite all with similar chemical composition but different physical behavior and hence, uses. To know more about their properties, occurrences and uses in refractories read the following articles:

As a refractory raw material, kyanite should have very negligible amount of impurities like free silica, alkali, iron oxides, calcium and magnesium. *Kyanite*, *Sillimanite* and *Andalusite* all these three minerals convert to Mullite and silica when they are calcined to temperatures between 1250°C and 1500°C. The inversion kyanite to mullite and silica (glass) begins at the periphery of grains and this rate of conversion depends the following:

- >> Particle size
- >> Firing temperature
- >> Soaking time
- >> Impurities present.

The heating of raw kyanite is accompanied with its volume expansion and a decrease in its specific gravity from 3.6 to 3.06, which takes place over a small range of temperature around up to 1350°C. Because of this property raw kyanite is extensively used for making high alumina

insulation bricks, insulating mortars and castables. Also raw kyanite fines (pulverized) are added to clays in different proportions as a measure to control the overall shrinkage.

In order to make it a volume stable refractory material, kyanite is pre-calcined at 1420°C to mullite and cristobalite before use. Sometimes the lumps are very hard to crush after calcination. To avoid this, after calcination the kyanite lumps are, sometimes, quenched in water to make them crumble easily. Thereafter, it is ground, graded into various fractions as per requirement. These grains of calcined kyanite being volume stable are used with other raw materials for making refractory bricks and castables. The various refractory properties are:

P.C.E - above 1785°C or + 35 (OC)

RUL (refractoriness under load) - 1750°C

Porosity = 24-25%

Properly calcined kyanite is a very good refractory raw material because of its high alumina percentage and low iron contents. As compared to other refractory raw materials kyanite can be sometimes, very handy for boosting alumina content and other refractory properties of the product at the same time maintaining its cost effectiveness.

Source : <http://viewforyou.blogspot.in/2009/04/use-of-kyanite-as-refractory-raw.html>