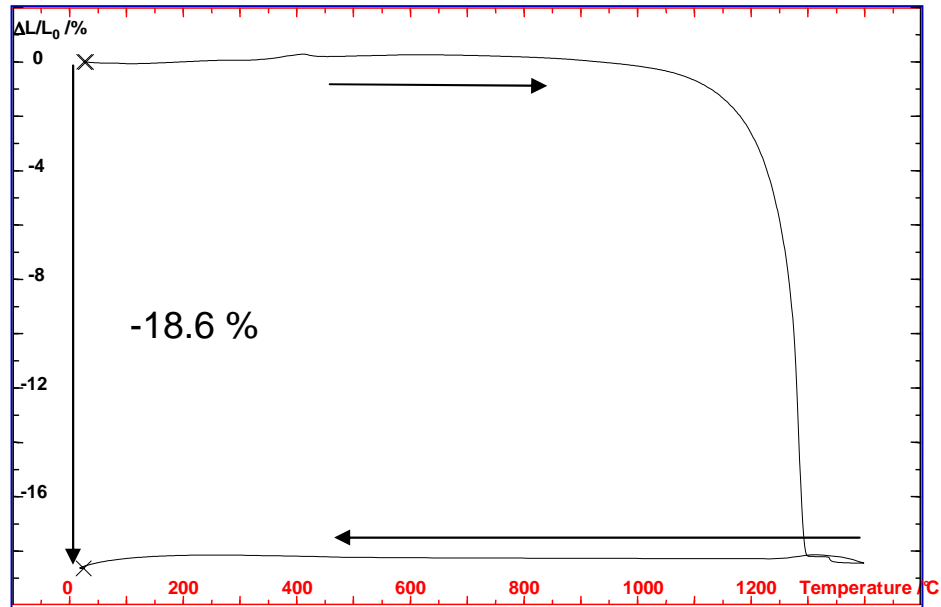


Sintering of a WC + Co pellet

Introduction: Sintering is a process for making objects from powder, increasing the adhesion between particles as they are heated. It is used with ceramic powders and in powder metallurgy. Sintering is related to diffusion.

Tungsten carbide is generally prepared from a powder containing WC and Cobalt as a binder.



Experimental

The initial sample is compressed material having the sizes : 8.0 mm x 6.5 mm x 6.4 mm.

The sample is analyzed with a Setsys Evolution TMA equipped with an alumina probe.

A load of 5 grams is applied against the sample.

The following temperature program is used:

- Heating from ambient up to 1400°C at 5 K/min.
- Cooling from 1400°C down to ambient at 5 K/min
- Atmosphere : argon

Results

The TMA curve show that there is almost no expansion up to 900°C, then the shrinkage becomes visible and is maximum between 1200°C and 1300°C.

One can say that the shrinkage due to the sintering is completed at 1300°C.

After cooling back at ambient, one can observe a permanent shrinkage of 18.6%.

Instrument
Setsys Evolution TMA
(ambient to 1600°C)



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