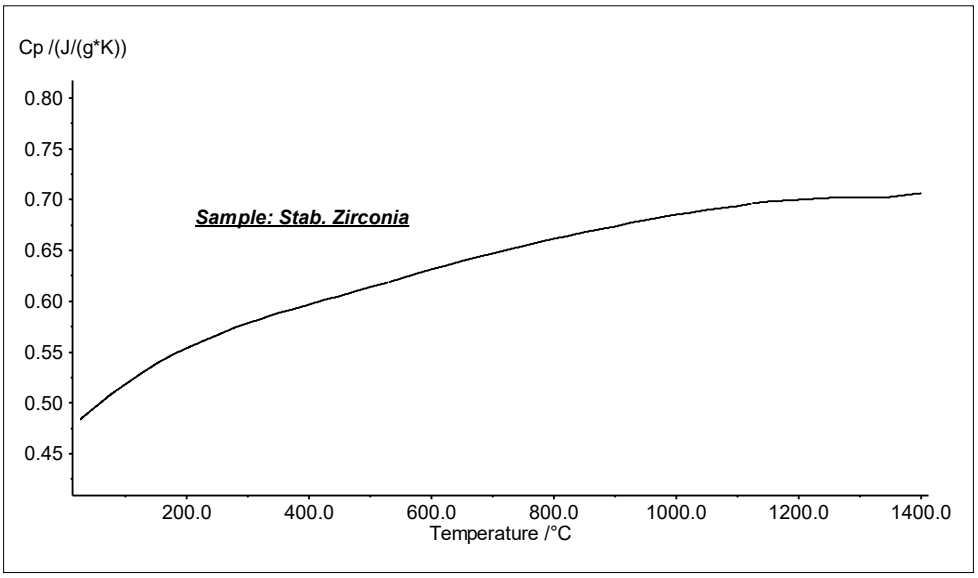
APPLICATION**SHEET**

Ceramics · Energy
DSC 404 *Pegasus*®

Stabilized Zirconia

Introduction

Zirconium dioxide, better known as zirconia (ZrO_2), exists as a monoclinic, tetragonal and cubic crystal modification. The most familiar and commonly used modification is the cubic form, which occurs for pure zirconia only at temperatures above 2950 K. In order to stabilize the cubic form also at room temperature, other oxides are added as stabilizers. Zirconia has some special properties such as high bending and tensile strength, high abrasion and corrosion resistance, low thermal conductivity and a thermal expansion similar to cast iron. It can therefore be used as thermal barrier coatings for gas turbine blades Another material-specific property of zirconia is the ability to conduct oxygen ions at elevated temperatures. This phenomenon can, for example, be utilized for measurement of oxygen partial pressures or for the preparation of solid oxide high-temperature fuel cells.



Test Conditions

Temperature range:	RT ... 1400°C
Heataing/cooling rates:	20/min
Atmosphere:	Argon at 50 ml/min
Sample mass:	82.04 mg
Crucible:	Pt with liner and coating
Sensor:	DSC type S

Test Results

Presented in the plot is the specific heat of an yttria stabilized zirconia sample between room temperature and 1400°C. Starting at approximately 0.48 J/(g*K) at room temperature, the specific heat increases over the entire temperature range. At high temperatures, nearly no temperature dependence was obtained, which is in agreement with the well-known Debye theory. It can clearly be seen that no phase transition is visible in the temperature range between 1100 and 1300°C. This proves that the sample measured here was fully stabilized. No monoclinic form was in the sample at room temperature.

NGB · Application Sheet 006 · E · 0521 · Technical specifications are subject to change.

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