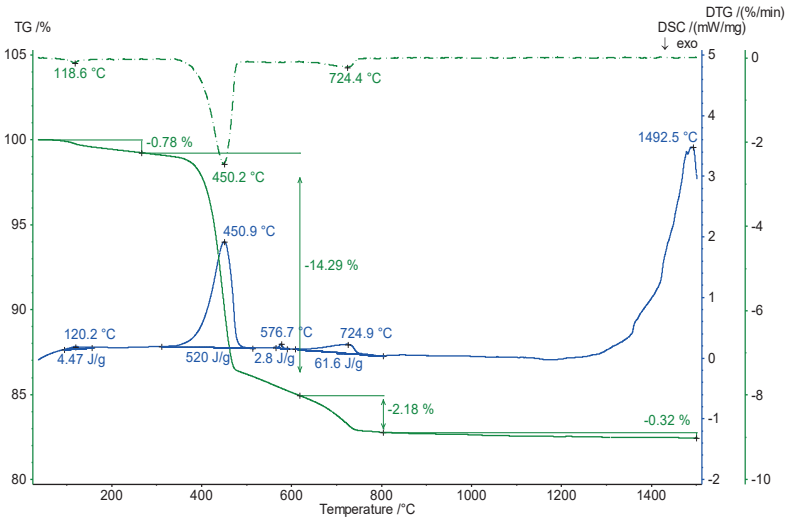
APPLICATION**SHEET**

Inorganics · Ceramics
STA 2500 *Regulus*

Oxide Refratory

Introduction

Refractory materials retain their strength at high temperatures. They are used to make crucibles and refractory linings which line furnaces, kilns and incinerators. The oxides of magnesite and dolomite are the most important refractory materials, though fireclay is also widely used. Zircon is used when the material must withstand extremely high temperatures. Silicon carbide is another refractory material. It is very strong at high temperatures, but burns in the presence of oxygen, if the protective silica coating comes off. Refractories must be chosen according to the conditions they will face. For example, carbon cannot be used when it will be in contact with oxygen, as it will burn. Acidic refractories cannot be used in a basic environment and basic refractories cannot be used in acidic environment because they will be eroded. Zircon, fireclay and silica are acidic, dolomite and magnesite are basic and alumina, chromite, silicon carbide, carbon and mullite are neutral. Refractory materials must be strong at high temperatures, resistant to thermal shock, chemically inert, and have low thermal conductivities and coefficients of expansion.



Test Conditions

Temperature range:	RT ... 1500°C
Heating rate:	10 K/min
Atmosphere:	Nitrogen at 70 ml/min
Sample mass:	51.52 mg
Crucible:	PT
Sensor:	TGA-DSC type S

Test Results

The temperature-dependent mass change (TGA), rate of mass change (DTG) and heat flow rate (DSC) of an oxide refractory were measured. The first mass-loss step is most probably due to the evaporation of humidity while the second and third mass-loss steps are most probably due to the release of bound water and due to the decomposition of carbonate. At highest temperatures, the sample started evaporating. A melting peak was furthermore detected in the DSC signal at 1493°C. The endothermal DSC peak at 577°C with an enthalpy of 2.8 J/g is due to the structural α→β phase transformation of a quartz component.

NGB · Application Sheet 069 · E · 0621 · Technical specifications are subject to change.

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