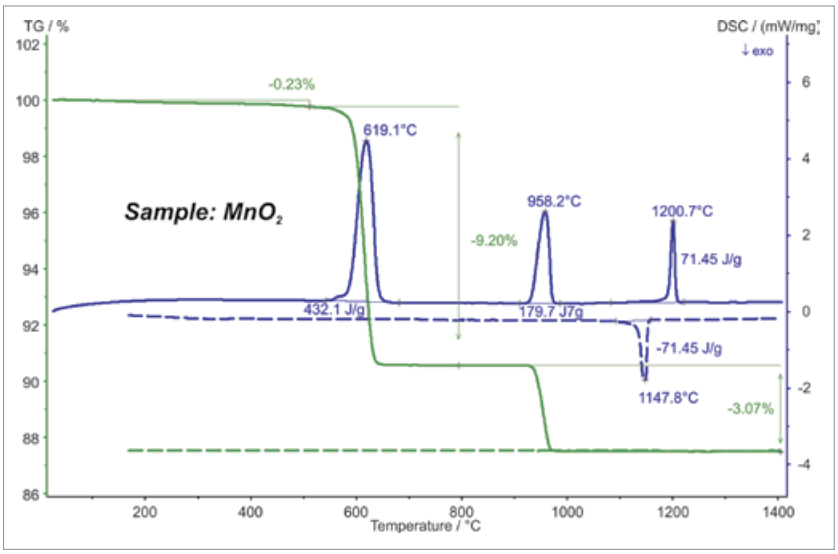
APPLICATION**SHEET**

INORGANICS – RESEARCH/CERAMICS/CHEMISTRY

MANGANESE DIOXIDE

Manganese dioxide (MnO_2) is a blackish or brown solid occurring naturally as the mineral pyrolusite which is the main ore of manganese. The main use of MnO_2 is for cathode materials in dry-cell batteries, such as the alkaline battery and the zinccarbon battery. Manganese dioxide is also used as an oxidant in organic synthesis: For example, allylic alcohols can be oxidized to the corresponding aldehydes. It can also be used as a catalyst, for instance in the preparation of oxygen from potassium chlorate.



Instrument

STA 449 ***F1*** *Jupiter®*

Test Conditions

Temperature range	RT ... 1400°C
Heating/cooling rates	20 K/min
Atmosphere	synthetic air (70 ml/min)
Sample mass	32.14 mg
Crucible	Pt
Sensor	TG-DSC type S

Results

The STA measurement shows mass-loss steps at approx. 600°C and 950°C which are due to the reduction of MnO_2 into Mn_2O_3 and finally into Mn_3O_4. The values of 9.20% and 3.07% match exactly with the stoichiometrical values thus reflecting the high accuracy of the balance system. Endothermic DSC peaks with enthalpies of 432 J/g and 180 J/g were detected during the reduction steps. The endothermic DSC peak at 1200°C is due to a reversible structural transformation which was observed at 1148°C upon cooling (dashed lines).

NGB · AS · 184-2008 · EN · 07/13 · Technical specifications are subject to change.

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