

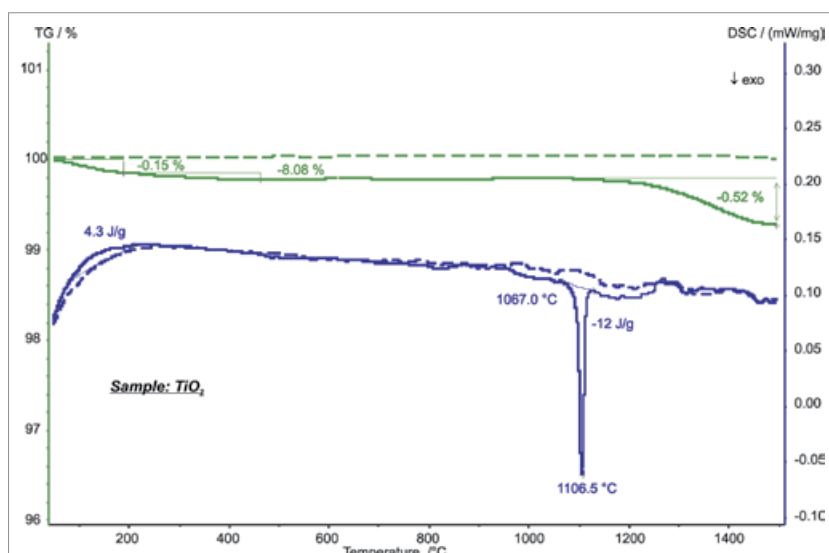
# APPLICATION SHEET

ORGANICS/INORGANICS – CHEMICAL INDUSTRY

## TITANIUM DIOXIDE

Titanium Dioxide ( $\text{TiO}_2$ ) is the most important white pigment. It possesses valuable properties like a high covering power at a relatively low price and is at the same time chemically inert and also light-resistant. Wall paint, pharmaceuticals, tooth paste and paper contain, for example, titanium dioxide as whitening substance. There are also more sophisticated applications of  $\text{TiO}_2$ : self-cleaning sur-

faces can be created using the photo-catalytic effect of modified  $\text{TiO}_2$ . Titanium dioxide nanoparticles change their color depending on the angle of view which is used in effect finishings. The most important modifications of  $\text{TiO}_2$  are brookite, anatase and the high-temperature phase rutile. The transformation into rutile can strongly depend on impurity phases.



### Instrument

STA 449 **F3** Jupiter®

### Test Conditions

Temperature range	RT ... 1500°C
Heating/cooling rates	10 K/min
Atmosphere	$\text{N}_2$ (70 ml/min)
Sample mass	91.34 mg
Crucible	Pt
Sensor	TG-DSC type S

### Results

The STA measurement shows two mass-loss steps of 0.15% and 0.08% below 400°C which are most probably due to the release of moisture. At an extrapolated onset of 1067°C, a sharp exothermic DSC peak with an enthalpy of -12 J/g occurred which indicates the so called rutilization. Here, the anatase modification of  $\text{TiO}_2$  transforms into rutile. Above ~1100°C, a further mass loss of 0.52% was observed which could be due to the decomposition of sulphate impurities. The second heating of the sample (dashed lines) did not reveal any effects.