

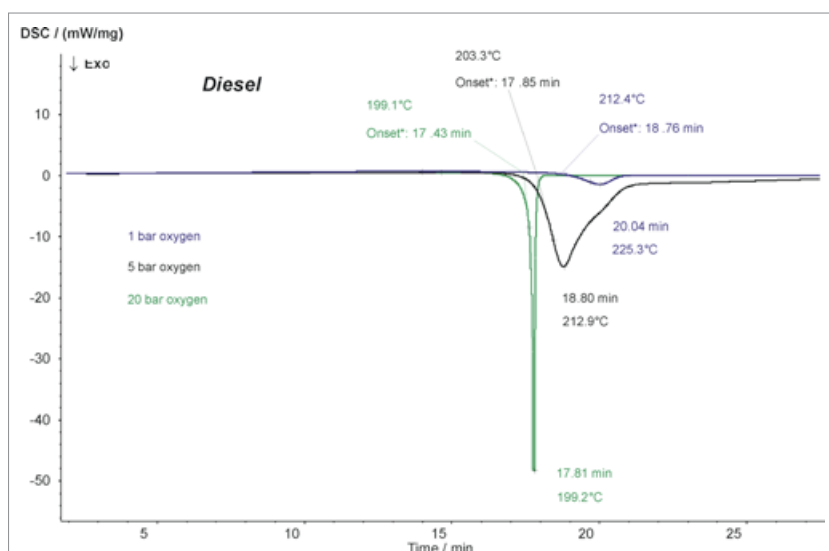
# APPLICATION SHEET

## ORGANICS – CHEMICAL INDUSTRY

### DIESEL

Diesel or Diesel fuel is a specific fractional distillate of fuel oil (mostly petroleum) that is used as a fuel in a diesel engine invented by the German engineer Rudolf Diesel. Due to great improvements concerning quiet running and acceleration in recent years, diesel engines in private cars have become more and more popular. Low consumption of diesel fuel was ever an advantage of

these engines in comparison to others. In order to study the combustion behavior, it is necessary to simulate the situation inside the combustion chamber. The High-Pressure DSC 204 *Phoenix*<sup>®</sup> enables temperature-dependent measurements of the combustion reaction of fuel and oxygen at precisely controlled pressures up to 15 MPa (150 bar).



#### Instrument

DSC 204 HP *Phoenix*<sup>®</sup>

#### Test Conditions

Temperature range	RT ... 300°C
Heating/cooling rates	10 K/min
Atmosphere	Oxygen at 100 ml/min
Sample mass	15.0 ± 1 mg
Crucible	Aluminum, open
Sensor	1, 5 and 20 bar

#### Results

Oxidation reactions such as fuel combustion can be investigated by using high-pressure DSCs (HP-DSC). A sample droplet was placed into an open aluminum crucible and the total DSC measuring cell was exposed to different pressures. The results obtained between ambient pressure and 20 bar are presented above. With an increasing oxygen pressure, the extrapolated onset (representing the beginning of the exothermic oxidation) as well as the peak temperatures are shifted to lower temperatures. Together with the significant change in the peak shape, it is an indication of increasing efficiency of the combustion reaction. 20 bar is the usual compression of the gas in diesel engines.