

## **Abstract**

Three Way Catalytic Converters (TWCs) have been in use for the exhaust gas aftertreatment of spark-ignited engines for more than two decades now. During this period, emission limits enforced by legislation in Europe and elsewhere have been roughly cut in half every five years. In addition to these limits, regulations were introduced, which make the persistent monitoring and the indication of malfunctions of the exhaust gas aftertreatment system including the sensors compulsory.

In order to meet stringent regulations, various concepts have been developed which not only aim at the stoichiometric control of the raw exhaust gas entering the TWC, but also at internal states of this device, usually the oxygen storage level.

In this thesis, an alternative method and a low cost arrangement for a quick determination of the dynamic Oxygen Storage Capacity (d-OSC) of nanostructure ceramic materials that are used in Three Way Catalyst (TWC) manufacture has been established.

For this scope, cyclical exchanges of redox conditions are being reproduced inside a micro-reactor system by the use of a synthetic gas (syn-gas) in high frequency. Whereas, d-OSC is calculated by the signal of two  $\lambda$ -sensors that are placed upstream and downstream the reactor.