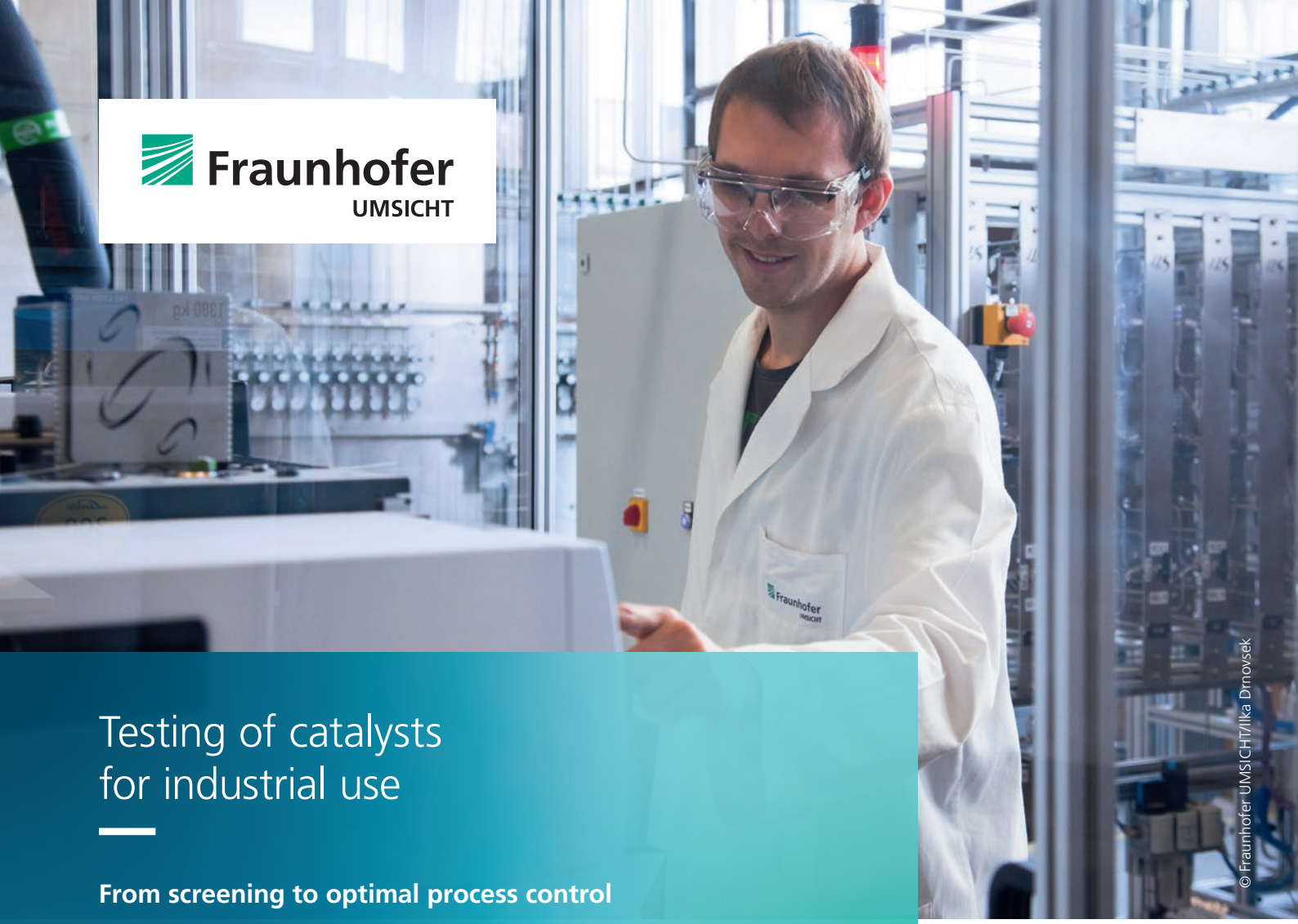

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Testing of catalysts for industrial use

From screening to optimal process control

Testing is an essential step in catalyst development. Only an investigation under process conditions relevant to the application provides the necessary information about the suitability of a material in an industrial process.

Catalyst testing at Fraunhofer UMSICHT

Fraunhofer UMSICHT has a number of laboratory and pilot plant facilities for catalyst testing. They enable the testing of new as well as commercially available catalysts of the most diverse development stages. In addition to rapid screenings of powdered catalyst samples in an early development phase under standardized conditions, the detailed investigation of shaped catalysts under process-relevant conditions is also feasible.

With our test systems, even complex gases from technical applications can be simulated for testing. In addition, our systems cover a wide temperature and pressure range as well as the use of NT plasma for testing and can thus meet the sometimes rigorous test requirements in catalyst testing.

In combination with the appropriate instrumental analysis, we can optimize catalysts for you under industrially relevant process conditions and determine important catalyst parameters such as conversion, selectivity and productivity.

The focus of our activities is always on catalyst optimisation tailored to the wishes of our customers.

Industrial sectors

- Chemical industry
- Steel industry
- Cement industry
- Fuel cell manufacturers
- Engine manufacturers
- Exhaust gas aftertreatment

Technological specifications

8-fold parallel reactor system
- Rapid screening of small quantities of catalyst
- max. 450 °C at 60 bar
- Gases: H_2, CO, N_2, CO_2

Test rigs for detailed catalyst testing
- Extensive variation of process parameters and option to test shaped catalysts
- max. 500 °C at 60 bar/1000 °C at 1 bar
- Liquid evaporator for water and organic components
- Solid evaporator
- Gases: H_2, CO, CO_2, CH_4, N_2, Ar, O_2, test gas
- Use of sulphurous gases possible

Instrumental analytics
Quantitative determination of complex reactant and product gases:

- Online gas chromatography (thermal conductivity detector, flame ionization detector)
- Quadropole mass spectrometer
- Fourier transform infrared spectrometer
- Electrochemical oxygen sensor

NT plasma reactor
- Gases: H_2, CO, CO_2, CH_4, N_2 and O_2
- Addition/vaporization of liquid components possible (e. g. H_2O, Toluol)
- 0-20 kV, 4-500 kHz, bis 200 °C, experiements up to 1 Nm^3/h

Our service

Our service starts with your first contact. We provide you with comprehensive advice and work with you to identify the optimum test rig for testing your catalyst.

The testing can be carried out by varying the residence time, whereby the composition of complex test gas matrices is easily possible through a large number of separate gas lines. Gas components containing sulphur can also be used due to a special coating of the gas-carrying lines.

To optimize your catalyst, we quantify relevant parameters such as conversion, selectivity and productivity. We adapt the reaction conditions individually to your requirements.

Your benefit

We support you in the **optimization of your catalyst**. Based on our many years of experience and know-how in the field of catalysis and our modern equipment, we design a tailor-made solution for your problem.

Due to the flexibility of our equipment, we are able to perform testing in a wide range of process parameters up to industrial conditions.

We would be pleased to prepare an individual offer for your task.

Keywords

- Industrial catalysts
- Catalyst testing
- Reaction engineering parameters
- Reaction technology/ kinetics

Photo:
Both powdered catalysts and shaped catalysts (e. g. honeycombs or pellets) can be tested.

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Technologische Spezifikationen

8-fach-Parallelreaktorsystem
- Schnelles Screening kleiner Katalysatormengen
- max. 450 °C bei 60 bar
- Gase: H_2, CO, N_2, CO_2

Versuchsstände für detaillierte Katalysatortestung
- Umfangreiche Variation der Prozessparameter und Option zum Test von Formkörpern
- max. 500 °C bei 60 bar/1000 °C bei 1 bar
- Flüssigverdampfer für Wasser und organische Komponenten
- Schmelzverdampfer
- Gase: H_2, CO, CO_2, CH_4, N_2, Ar, O_2, Prüfgas
- Einsatz schwefelhaltiger Gase möglich

Instrumentelle Analytik
Quantitative Bestimmung von komplexen Edukt- und Produktgasen:

- Online-Gaschromatographie (Wärmeleitfähigkeitsdetektor, Flammenionisationsdetektor)
- Quadropolmassenspektrometer
- Fourier-Transformations-Infrarotspektrometer
- elektrochemischer Sauerstoffsensor

Unser Service

Unser Service beginnt schon bei Ihrer ersten Kontaktaufnahme. Wir beraten Sie umfassend und identifizieren gemeinsam mit Ihnen den optimalen Versuchsstand für die Testung Ihres Katalysators.

Die Testung kann unter Variation der Verweilzeit erfolgen, wobei die Zusammenstellung komplexer Testgasmatrizen durch eine Vielzahl separater Gaslinien problemlos möglich ist. Auch schwefelhaltige Gaskomponenten können aufgrund einer speziellen Beschichtung der gasführenden Leitungen eingesetzt werden.

Für die Optimierung Ihres Katalysators quantifizieren wir relevante Kenngrößen wie Umsatz, Selektivität und Produktivität. Dabei passen wir die Reaktionsbedingungen individuell Ihren Anforderungen an.

Ihr Nutzen

Wir unterstützen Sie bei der **Optimierung Ihres Katalysators**. Auf Grundlage unseres langjährigen Know Hows im Bereich der Katalyse und unserer modernen Ausstattung konzipieren wir eine maßgeschneiderte Lösungen auf Ihre Fragestellung.

Durch die Flexibilität unserer Anlagen sind wir in der Lage, die Testung in einem breiten Prozessparameterbereich bis hin zu industrienahen Bedingungen durchzuführen.

Gerne erstellen wir für Ihre Aufgabenstellung ein individuelles Angebot.

Keywords

- Industrielle Katalysatoren
- Katalysatortestung
- Reaktionstechnische Kenngrößen
- Reaktionstechnik/-kinetik

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Technologische Spezifikationen

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In Zusammenarbeit mit

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Weiterführende Informationen

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