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Catalyst characterization by thermal conductivity detections (TCD)

Module Goals

Students will learn:

- Principles of thermal conductivity detector
- Application of thermal conductivity for catalyst characterization
- Type of experiments for catalyst characterization
 - Temperature-Programmed Desorption (TPD)
 - Temperature-Programmed Reduction (TPR)
 - Temperature-Programmed Oxidation (TPO)
 - Temperature-Programmed Reaction
 - Pulse Chemisorption
- Samples
 - Solid phase
 - Usually fine powders
 - Pd/Al₂O₃ and Pt/Al₂O₃
 - About 0.5 grams
- Advantages
 - High levels of automation
 - Very few steps must be physically performed by an operator; this reduces the possibility of human error.
 - Error is directly related to the accuracy of the calibration performed by the user in the instrument.
- Disadvantages
 - Only for solid samples
 - Mass of catalyst should be sufficient
 - Measurements of low loadings (active metal) is challenging task

