

Micro-Scale Gas-Solid Catalytic Reaction Educational Pilot Plant

Item Number: LPK-TLCR



Introduction

Explore heterogeneous catalysis with this micro-scale gas-solid catalytic reaction educational pilot plant. Designed for university labs, it enables hands-on study of reaction kinetics and transport phenomena in a benchtop packed bed reactor with high-precision flow control and touchscreen automation.

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System Component / Parameter	Specification / Technical Capability	Associated Educational Unit Operations & Concepts
Reactor Type	Quartz or stainless steel micro-reactor	Fixed-bed reactor design, gas-solid heterogeneous catalysis, space velocity calculations
Flow Control Range	Dual/triple gas paths with mass flow controllers (precision: 0.1 ml/min)	Ideal gas law applications, reactant ratio control, fluid flow through packed beds
Thermal Control System	High-temperature furnace with multi-stage PID controller	Heat transfer in porous media, Arrhenius equation, catalyst activation energy determination
System Automation	High-definition PLC touchscreen interface with automated valve switching	Process dynamics, automated control loops, system startup and shutdown procedures
Safety & Monitoring	Over-temperature alarms, pressure relief valves, and real-time sensor logging	Process safety management (PSM), pressure drop analysis in packed beds