Photocatalytic Membrane Separation And Degradation Unit Operations Pilot Plant

Item Number: LPK-CMBS

Introduction

Bench-scale pilot plant integrating photocatalytic degradation with membrane separation for engineering education. Study advanced oxidation, microfiltration, and hybrid processes using industrial sensors. Features safety light-blocking curtain, low-noise compressor, and durable stainless-steel construction.

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System Component / Experimental Module	Technical Parameters / Operational Capabilities	Core Concepts & Academic Alignment
Xenon Light Source Assembly	300 W Xenon lamp simulating solar spectrum, complete with adjustable intensity and a protective light-shielding curtain.	Photo-activation energy, reaction kinetics, and catalyst absorption characteristics.
Feed and Product Management	Corrosion-resistant 304 stainless steel tanks with high-accuracy gas (0–160 mL/min) and liquid (0–10 L/h) rotameters.	Material balances, volumetric flow rates, and residence time distribution (RTD).
Pressurized Membrane System	Pressure-regulating pump operating up to 16 bar, supported by shock-resistant mechanical pressure gauges.	Transmembrane pressure (TMP), membrane permeability, and hydraulic resistance.
Photocatalytic Degradation Module	Batch or continuous degradation of organic model compounds using suspended or immobilized catalysts.	Heterogeneous catalysis, reaction rate constants, and mass transfer limitations.
Membrane Separation Module	Filtration and concentration of treated effluents with active monitoring of flux decline.	Membrane fouling, concentration polarization, and solute rejection coefficients.