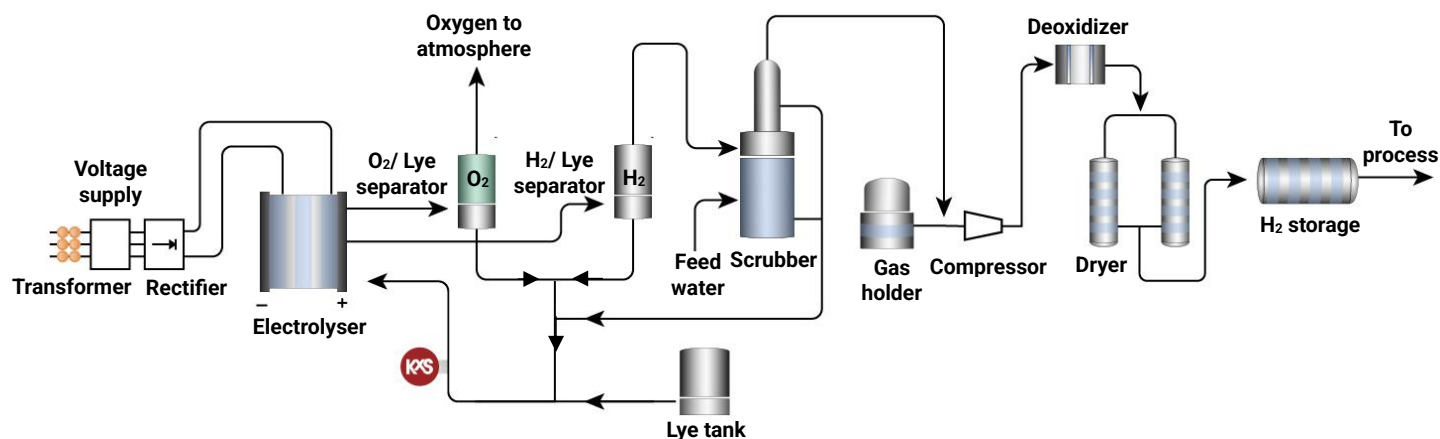




Benefits of R.I. measurement

- Real-time monitoring of KOH concentration for optimal electrolyte conductivity
- Enhanced process efficiency and stability
- Reduction in energy consumption through precise concentration control
- Reliable measurement in challenging operational conditions, including high temperatures, vibrations, and corrosive environments.

Overview

Alkaline water electrolysis (AWE) is a mature, industrial-scale technology used extensively for hydrogen production for over a century.

The process utilizes potassium hydroxide (KOH) as a conductive electrolyte, facilitating electrical current flow necessary for water splitting. In AWE, the anode and cathode electrodes are separated by a diaphragm, preventing the recombination of hydrogen and oxygen gases generated during electrolysis.

Several factors impact the efficiency of the electrolysis process, including electrolyte concentration, temperature, electrode materials, and current density. Precise control of electrolyte concentration, particularly potassium hydroxide (KOH), is critical for achieving optimal conductivity, efficiency, and process stability.

Refractive index measurement applications

The efficiency of alkaline electrolysis relies heavily on maintaining optimal electrolyte concentration. Typically, a concentration around 30 wt% KOH achieves a favorable balance, providing high conductivity and low viscosity necessary for efficient current flow.

Excessively high KOH concentration risks gas bubble formation on electrode surfaces, leading to reduced operational efficiency. Accurate, continuous concentration measurement is crucial for maintaining optimal current density and achieving maximum process performance.

KxS Technologies DCM-20 Inline Process Refractometer is ideally suited for ensuring precise control and stable concentration of KOH in electrolytic systems. The refractometer provides robust, accurate, and reliable measurements, critical for achieving sustained high electrolysis performance.

Instrumentation and installation considerations

The KxS Technologies DCM-20 refractometer is specifically designed for rigorous chemical and industrial applications, making it an ideal choice for alkaline electrolysis plants. It withstands harsh and corrosive environments, extreme operating temperatures (such as 90-95°C / 194-203°F typical of electrolyzers), high pressures, and vibrations commonly encountered in industrial electrolysis operations.

The DCM-20 can be installed directly into main processing lines, bypass lines, or electrolyte tanks, utilizing versatile connection methods, including industrial flanges, L-couplings, dedicated flow cells and pipe sections. Its rugged construction, with wetted parts available in corrosion-resistant alloys such as *Nickel* or other higher-grade materials, ensures long-term reliability.

Key product features:

- Superior accuracy ensures consistent electrolyte concentration
- Withstands harsh, corrosive environments, extreme temperatures, pressures, and vibrations
- Dual analog (4-20mA) and digital outputs (Modbus TCP)
- User-friendly HMI unit for easy local display and control
- Certified for hazardous areas (ATEX/IECEx Zone 2)

For customized solutions beyond standard offerings, including specialized wetted materials or custom connections, KxS Technologies provides engineered solutions tailored specifically to demanding application requirements.

Utilizing KxS refractometers in alkaline electrolysis significantly enhances operational reliability, measurement precision, and overall hydrogen production efficiency.