

Real-time Fluoride Measurement in Petrochemical Industry



British Petroleum (BP) replaced one of its existing Tytronics online fluoride analyzers at the Castellón refinery in Spain with the online Instran® Fluoride analyzer. Since its installation in January 2022, the Instran® analyzer has been operating continuously and has met the facility's needs to monitor fluoride levels in real-time within the alkylation zone.

Alkylation Process

In refineries, the main objective of the alkylation process is to produce a high-quality gasoline from olefins, mainly butylene, as it is the olefins that generate the highest quality in the final product.

The alkylation process (Figure 1) consists of a chemical synthesis in which small-chain olefins (mainly propylene and butene) are joined with isobutane (from the LPG fraction recovered in the atmospheric distillation of petroleum).

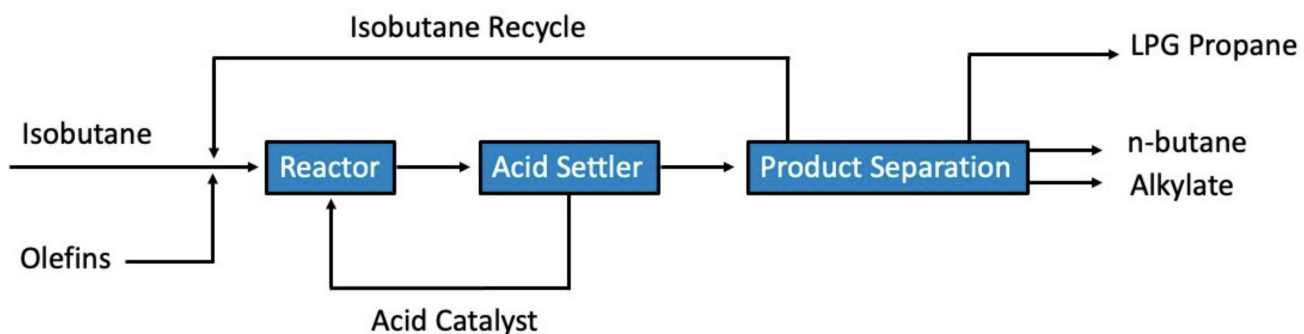


Figure 1: The Alkylation Process

An acid catalyst is required for the reaction process, with hydrofluoric acid (HF) being the most used coolant because of the low temperatures (around 30°C) at which the reaction is carried out. However, hydrofluoric acid is a very strong acid, which is highly corrosive and can cause serious harm to people. In refineries, the alkylation area is usually more protected than other areas of the plant, indicating the high degree of danger.

The Need to Measure Fluoride

To mitigate the risk of using HF, refineries monitor the alkylation zone for a leak in the hydrofluoric acid circuit by measuring fluoride levels in the cooling system water. In the event of a leak in the circuit, the HF would be diluted in the cooling water, thus increasing its concentration in the cooling water. In the event of such an incident, the plant would have to act quickly to contain the potential for serious damage. Monitoring fluoride levels in real-time with a reliable and accurate online water quality analyzer is integral to maintaining safety of the alkylation zone and overall refinery.

Instran® Online Analyzer

Instran® online inorganic water quality analyzers provide accurate, rapid, real-time, reliable and multi-stream analysis of inorganic contaminants such as ammonia, fluoride, phosphate and nitrate.

The analyzers provide high frequency real-time data with a sensitivity of 10 ppb or 0.01 mg/L and a measurement time of approximately 10 minutes to support sustainable, accurate control of industrial water and wastewater treatment processes. The fully automated online Instran® analyzer can operate reliably regardless of sample matrix conditions, a unique attribute of this innovative technology.



Instran® Fluoride analyzer