Estimating the Purity of Glycerin by Titration

AN #: 01_001_11_004
Subcategory: Health & Beauty
Market: Laboratory
Product: HI902C, HI1131B

Description:
Glycerin is a colorless, odorless, non-toxic liquid with a syrupy texture and particularly sweet taste. It is also an effective solvent, as many substances dissolve more easily in glycerin opposed to water or alcohol. Due to its characteristic properties, glycerin is widely used in the production of toiletries, personal care products, pharmaceuticals, and food products. One of the most common uses of glycerin is in the manufacturing of cosmetics and other beauty products. Glycerin is highly hygroscopic, meaning it has the ability to absorb water from the surrounding environment. The hygroscopic nature of glycerin makes it a desirable component of cosmetic products, as it is able to maintain and draw moisture to the skin.

Glycerin can be derived from both natural and synthetic methods. Glycerin is naturally found in the cells of plants and animals, and can be obtained as a byproduct from biodiesel production. This byproduct, crude glycerin, having a purity of approximately 80%, is subsequently purified to higher grades prior to commercial sale. The most common method for glycerin purification is vacuum distillation with steam injection. The crude glycerin is first heated to 194°F (90°C) and then put through a filtration process. After the initial purification process, the purity of the glycerin is analyzed; in rare cases, the glycerin requires a second cycle through the purification procedure to reach the target purity.

A customer who wished to analyze glycerin purity in-house approached Hanna regarding an automatic titrator. The customer, a purifier of byproduct glycerol for resale, was currently outsourcing their samples for analysis and now sought to set up a laboratory of their own. Hanna offered the HI902C Automatic Titrator, along with the HI1131B General Purpose pH Electrode. The customer appreciated that the HI902C supported the ASTM D7637-10 Standard Test Method for Determination of Glycerin Assay by Titration, which is based on the cold oxidation of glycerol by sodium metaperiodate. This oxidation produces formic acid, which is then titrated with sodium hydroxide to a fixed endpoint of pH 8.1. The amount of acid produced during oxidation is directly correlated to % glycerin purity. With the help of automatic titration, they could determine the efficiency of their processes by analyzing the amount of glycerin both before and after purification. This more accurate and cost-effective testing method enabled the customer to target more industries and potential customers for both crude and purified glycerin. In addition to glycerin analysis, the customer wished to perform additional methods including concentration of soap, concentration of catalyst, and others. For this reason they valued the ability of the HI902C to support two analog boards, allowing them to switch between channels and perform titrations in an efficient, timely manner. Overall, the HI902C provided a cost-efficient and highly accurate solution for their testing needs.