

## **KARL FISCHER WATER ANALYSIS**

Karl Fischer titrimetry is an accurate and well-known water measurement method utilizing the quantitative reaction of water with iodine. This method is widely used as the standard method of water measurement because of its high selectivity and sensitivity.

In Coulometric Karl Fischer titration, iodine is generated electrolytically at the anode and reacts with the water present according to the Karl Fischer reaction. The amount of water titrated is proportional to the total electrolysis current and the water content is directly determined from the current required for the titration.

Water may be present in the sample in several forms:

- 1) FREE H<sub>2</sub>O
  - a) Hygroscopic - water retained by surface tension within a powdery mass. Loss occurs from Room Temperature (RT) - 200C.
  - b) Interstitial - water retained in or occurring in interstices that are defined as small, fine cracks, pores, between parts or things of a powdery mass. Loss usually occurs from 75- 600C, in some cases up to 1000C.
- 2) HYDRATED (Water of Crystallization, Chemically Bound Water) - H<sub>2</sub>O molecules retained within the crystal lattice. Loss can occur in steps from RT-600C.
- 3) HYDROXYLATED (Basic, OH-) - negatively charged OH- present in the crystal lattice. Dehydroxylation can occur from RT-1600C.

Samples may be liquids or solids. Most liquids can be measured by direct injection of the sample into the titration cell. This measurement is done at room temperature. A water vaporizer is used for solid samples. The sample is heated to the selected temperature (from 75- 950C) in an evaporation chamber and the vaporized water is carried into the titration cell by nitrogen gas.

Sample size: 1g minimum

Turnaround: 2 weeks, 1 day minimum

Contact: Terri Rissmiller (610) 250-3211  
Diane Kramer (610) 250-3093