



APPLICATION NOTE – POLYMER PRODUCTION

Application Need: The process by which relatively small molecules, called monomers, combine chemically to produce a very large chainlike or network molecule, is called polymerization. The monomer molecules may all be alike, or they may represent two, three, or more different compounds. Usually at least 100 monomer molecules must be combined to make a product that has certain unique physical properties. Real time monitoring of this polymerization process is critical to ensure reaction completion and product quality. Unfortunately, this type of monitoring can be rather difficult.

The Problem: A wide variety of laboratory analysis techniques which require extensive sample preparation, relatively expensive laboratory equipment, long analysis times, and highly trained operators. Another common method used to determine the percent reaction completion, or percent polymerization, is the oven drying method. This method, however, is fraught with potential sources of errors as well as very long sample analysis times.

Refractive index on the other hand, can be utilized to rapidly, and accurately monitor the process of the reaction by characterizing the optical properties of the solution. A correlation curve can be developed and utilized to determine the polymerization state and percent reaction completion. This correlation equation can then be programmed into the refractometer, allowing the user to read percent concentration, reaction completion, or any other unit of measure desired.

The Solution: Reichert automatic digital refractometers are ideal for measuring RI. Here is why:

- ✓ Sample color or opacity does not effect automatic refractometers. Fully automatic refractometers utilize the light that is reflected by the sample for analysis.
- ✓ Reduced operator error. An electronic detector is used instead to take the measurement.
- ✓ Temperature may be controlled via an external circulator on the AR6 Series, ARIAS, and MARK models or by a built in Peltier Thermal Control System on the AR7 Series.

Product Recommendations:

AR7 Series Automatic Refractometers, Reichert Cat # 13107000 & 13107700 **AR6**

Series Automatic Refractometers, Reichert Cat # 13106000 & 13106600

r²i300 compact Automatic Refractometer, Reichert Cat # 13980000

AR200 Digital Handheld Refractometer, Reichert Cat # 13950000

ARIAS OptiMatrix 500 Semi-Automatic Refractometer, Reichert Cat # 1310499SA **ABBE**

MARK III Refractometer, Reichert Cat # 13104088M

