**CHEMICAL PROCESS TECHNOLOGIES**

**Alkoxylation**

Alkoxylation is an industrial process in which an active hydrogen compound, such as an alcohol, phenol, or amine, reacts with an epoxide to give the resulting addition product, an alcohol. The product can also react with additional epoxide, potentially growing a chain of increasing length. Control of the chain length depends on the catalyst and reaction conditions. Alkoxylation technology offers highly effective routes to surfactants and polyglycols. Alkoxylated alcohols, amines, phenols, cellulose, and polyglycols are used in surfactants, dispersants, foaming agents, cosmetics, and pharmaceuticals.

MATRIC has experience and capabilities to assist customers in research, development, and scale-up of alkoxylation processes. Staff members have over thirty years of experience in laboratory, pilot scale, and commercial operations involving safe handling of ethylene oxide, propylene oxide, and other epoxides.

We work closely with customers to design processes that meet the project goals and also comply with all regulations regarding epoxide handling. We are highly cognizant of the potential hazards involved, and we carry out thorough safety reviews and monitoring to ensure that all operations present the minimum risk to personnel and the environment.

In addition to small laboratory equipment, we employ a one-gallon reaction system with computerized process control and automated safety features. For larger scale operations, we have available a 10-gallon reactor and a 100-gallon reactor.

**Examples of recent MATRIC alkoxylation projects:**

- MATRIC carried out propoxylation reactions using novel catalysts to prepare materials of varying molecular weight. Multiple samples were prepared in kilogram quantities for physical property studies.

- A novel polymerization process involving ethylene oxide was performed on a kilogram scale. Multiple samples were prepared for applications testing.

- A customer engaged MATRIC to review the design and construction of a unit for pilot-scale reactions of propylene oxide. Recommendations were provided to ensure that the risks were managed appropriately.

- A customer required multiple kilograms of a product made by addition of ethylene oxide to a polyamine. MATRIC developed and scaled up the process and also discovered a novel purification step for the desired product.

- A customer requested MATRIC’s help to prepare samples of alkoxylated products to be used in performance testing.