PTMEG (91S9)

Polytetramethylene ether glycol (PTMEG), derived from tetrahydrofuran (THF), is a key ingredient in the production of a variety of elastomeric products, a major component of spandex fibers, and is also used in copolyester ether production.

In recent years processes for production of THF from butane via maleic anhydride, which could lead to wider availability and lower cost for this product, have been developed. Coupled with improved technology for PTMEG, this lowers the cost of producing the polyether glycol and could have a significant effect on the demand for this material.

One of the barriers to the production of PTMEG has been the utilization of fluorinecontaining acids (e.g. fluorosulfuric acid, hydrogen fluoride, or boron trifluoride) to catalyze the polymerization of THF. Aside from the high cost of these catalysts, there is the problem of neutralization and disposal of the by-product salts, and the requirement for acid-resistant construction materials.

In Japan Asahi Chemical has commercialized a new technology for PTMEG production, which eliminates the problems cited previously, via the use of a recyclable heteropolyacid as the catalyst. The comparison of this technology with the conventional route is therefore of considerable interest.

A flow diagram and economics for the Asahi process have been developed and compared with those for the conventional fluorosulfuric catalyzed route. The comparison shows the new route to be more economic.

PTMEG constitutes the difunctional glycol component in a variety of polyurethane systems, and is used for the soft flexible block in the production of thermoplastic and thermoset polymer systems - predominantly elastomeric systems, thermoplastic urethane cast elastomers, and RIM.

The only polyurethane fibers of commercial importance today are the elastic fibers known as spandex. Spandex fibers are chemically similar to thermoplastic polyurethane elastomers, in which the soft segments are polyether or polyester chains in the molecular weight range of 1,000 to 3,000, and the hard segments usually consist of substituted polyurethanes and polyureas.

Spandex fiber applications have experienced tremendous growth in recent years. Traditional applications are supportive clothing such as belts, women's lingerie, and surgical stockings.