Copolymerization Parameters of Allyl Glycidyl Ether

George E. Ham[a]

[a] Consultant to the Polymer Industry, Briarcliff Manor, New York

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NOTE

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GEORGE E. HAM

Consultant to the Polymer Industry
284 Pine Road
Briarcliff Manor, New York 10510

Interest in the copolymerizability of allyl glycidyl ether has been stimulated by recent industrial and academic interest in the monomer, because of its epoxy as well as allylic functionality. There is a paucity of information in the literature, however, concerning its copolymerization parameters with other monomers, and none, apparently, concerning its Q and e values.

Sorokin et al. [1] have reported reactivity ratios of allyl glycidyl ether with methyl methacrylate. In addition, reactivity ratios of butyl methacrylate and maleic anhydride have also been reported [2, 3] (Table 1).

TABLE 1. Reactivity Ratios of Allyl Glycidyl Ether (M_1)

Comonomer (M_2)	r_1	r_2	Ref.
Methyl methacrylate	0.035	40.7 (70°C)	1
Butyl methacrylate	0.02	27	2
Maleic anhydride	0.002	0.01	3

Q and e values of allyl glycidyl ether were estimated from the relationships:

$$r_1 = \frac{Q_1}{Q_2} \exp\{-e_1(e_1 - e_2)\}$$

$$r_2 = \frac{Q_2}{Q_1} \exp\{-e_2(e_2 - e_1)\}$$

Values of Q = 0.068 and e = 0.80 gave the best fit of the meager data and are in line with the known electron enrichment induced in a nearby double bond by the ether function and the low resonance stabilization of allyl and vinyl ethers and esters:

	Q	e
Allyl acetate	0.028	-1.13
Allyl chloroacetate	0.011	-0.43
Vinyl acetate	0.026	-0.22
Divinyl ether	0.037	-1.28
n-Butyl vinyl ether	0.087	-1.20
Isopropenyl acetate	0.045	-0.50

The contrast in e values with nonethers seems significant:

	Q	e
Allyl chloride	0.056	0.11
Allyl alcohol	0.052	0.29
Vinyl chloride	0.044	0.20

REFERENCES

[1] M. F. Sorokin, V. K. Latov, Zh. T. Korkishko, and Z. A. Kochnova, Plast. Massy, 1963, (5)11.
[2] Chemical Abstracts, 60, 1844h (1964).
[3] Chemical Abstracts, 68, 115001x (1968).