

CATIONIC COPOLYMERIZATION OF EPOXY RESINS AND SPIROORTHOESTERS UPON VOLUMETRIC EXPANSION

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Epoxy resins are one of the most abundantly used classes of polymers in a plethora of industrial areas. Recent research has addressed the photochemically-induced cationic polymerization of such epoxy resins [1]. In order to overcome the shrinkage during the curing reaction, so-called expanding monomers like spiroorthoesters SOEs can be copolymerized with the epoxy resins in ring-opening fashion [2-3]. In this study, mono- and bifunctional SOEs were synthesized by the one-step reaction of γ -butyrolactone with epoxides (Fig. 1A and 1B). In the course of the photochemically-induced cationic copolymerization of bisphenol diglycidyl ether-based epoxy compounds and varying amounts of the SOEs, polyester-co-polyethers were formed (Fig. 1C), and, instead of shrinkage during curing, expansion could be achieved. The dielectric properties of the polymer networks were investigated by permittivity measurements.

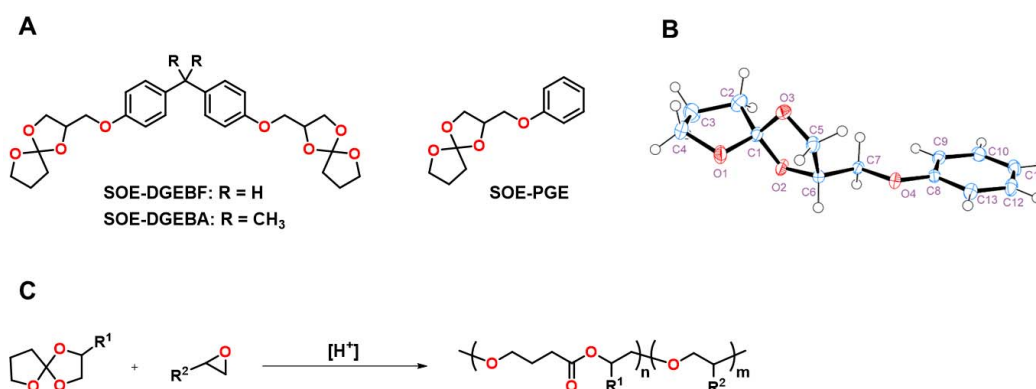


Figure 1. A: Chemical structure of the synthesized mono- and bifunctional SOEs. B: Crystal structure of SOE-PGE [2]. C: Schematic representation of the cationic copolymerization of epoxides and SOEs.

[1] D. Bomze, P. Knaack, R. Liska, *Polym. Chem.* **2015**, *6*, 8161-8167.

[2] P. Marx, A. Romano, R. Fischer, I. Roppolo, M. Sangermano, F. Wiesbrock, *Macromol. Mater. Eng.* **2019**, *304*, 1800627:1-1800627:5.

[3] P. Marx, A. Romano, I. Roppolo, A. Chemelli, I. Mühlbacher, W. Kern, S. Chaudhary, T. Andritsch, M. Sangermano, F. Wiesbrock, *Macromol. Mater. Eng.* **2019**, *304*, 1900515:1-1900515:10.