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GELS FROM POLYGLYCIDOL AND ITS DERIVATIVES – NEW MATERIALS FOR BIOLOGICAL APPLICATIONS

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The aim of this work is the synthesis of thermoresponsive network based upon biologically well tolerable polyglycidol and its derivatives.

Random copolymers of poly(glycidol-co-glycidol acetate) and poly(glycidol-co-ethyl glycidol carbamate) were synthesized in the reaction of polyglycidol with acetic anhydride or ethyl isocyanate. Polyglycidol, poly(glycidol-co-glycidol acetate)s and poly(glycidol-co-ethyl glycidol carbamate)s were chemically crosslinked with functionalized ethylene oxide oligomers (poly(ethylene glycol)-bis-(carboxymethyl)ether dichloride) or with hexamethylene diisocyjanate (figure 1).

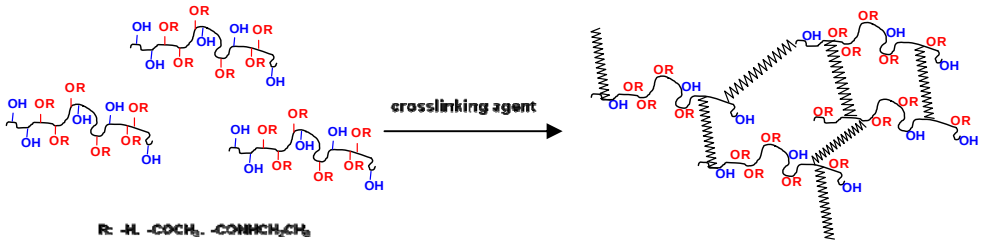

Fig. 1. Illustration of the polyglycidol and its derivative crosslinking

Hydrogel with swelling degree up to 5000% were obtained. The behaviour of the hydrogels as a function of temperature was investigated. At elevated temperature they were becoming hydrophobic, shrinking and releasing water and contained low molar mass compounds. This process is reversible. The swelling and shrinking behaviour can be controlled by varying the composition and substitution of the copolymer precursor and by the network density. The obtained hydrogels undergo several swelling/deswelling cycles in response to stepwise changes of temperature what indirectly demonstrate the mechanical stability of these hydrogels.