

## STUDY OF PHOTOCLEAVABLE EPOXY-ANHYDRIDE NETWORKS USING PHOTSENSITIVE *o*-NITROBENZYL ESTER LINKS

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The aim of the present study is the preparation of a photosensitive polymer network using a bifunctional epoxy based monomer bearing a photocleavable *o*-nitrobenzyl ester group (*o*-NBE) and a cyclic anhydride as a hardener.[1] Activation of the ring opening reaction of the anhydride is accelerated by tertiary amines. For these experiments, four different anhydride hardener are used. The photodegradable *o*-nitrobenzyl ester groups enable bond cleavage of the polymer network and change of specific material properties after exposure to UV-light. This includes a significant decrease of the glass transition temperature (T<sub>g</sub>) and a major change in solubility which is exploited for the preparation of positive-type photoresists. The network formation is monitored by FT-IR measurements following the distinctive reduction of the characteristic C=O absorption band of the anhydride hardener. Complete conversion of the anhydride hardener is achieved after 18 h at 100°C. In dependence on the anhydride structure, polymer networks with varying T<sub>g</sub> are obtained. The photocleavage kinetics of the thermally cured networks is determined by FT-IR spectroscopy and the results reveal that the cleavage rate correlates with the T<sub>g</sub> of the networks.

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[1] Radl, S., Kreimer, M., Manhart, J., Griesser, T., Moser, A., Pinter, G., Kalinka, G., Kern, W., & Schlögl, S. Photocleavable epoxy based materials. *Polymer*, **2015**, 69, 159-168.