Investigation of Chemically Recyclable Thiol-ene Crosslinked Photopolymers

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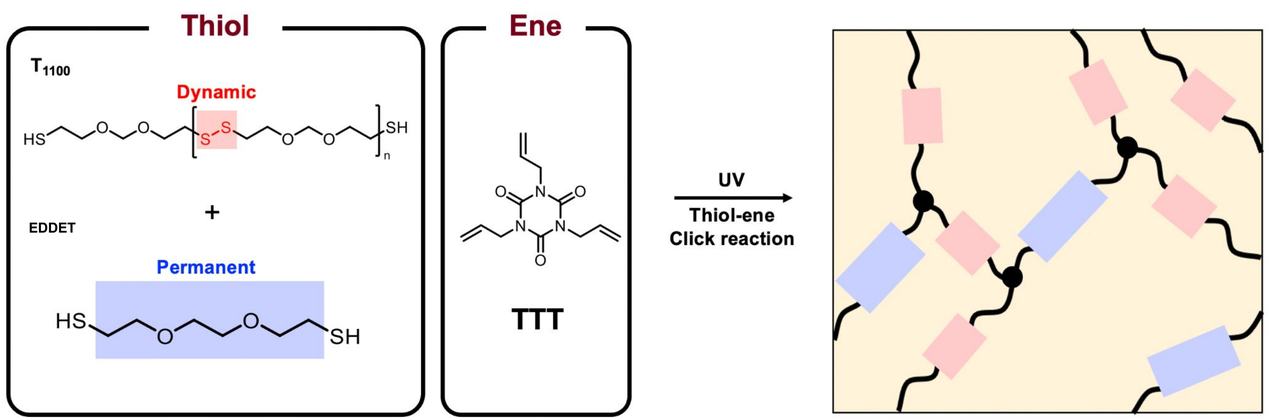

Fig. 1. Reaction schematic showing dynamic and permanent linkages

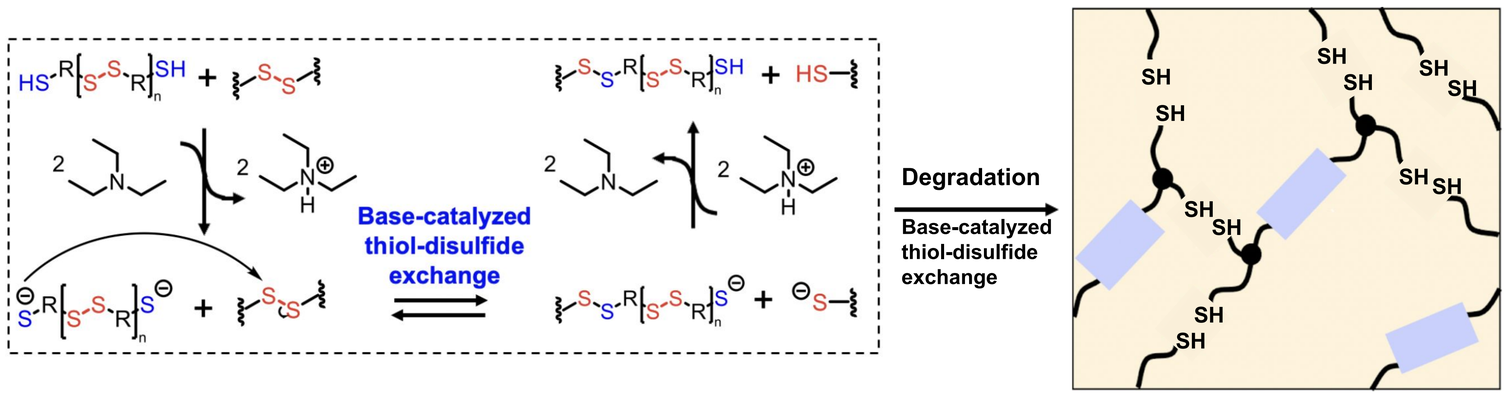

Fig. 2. Degradation of the film leaves permanent linkages in place while cleaving dynamic bonds

Background: Thiol-ene materials contain dynamic disulfide backbones which may be degraded via base-catalyzed disulfide exchange reactions, allowing chemical degradation of the polymer network. (i.e. molecular recycling of rubber materials)

Research Question: How many dynamic linkages may be replaced by permanent linkages before the film is no longer degradable?

Findings: 50% of the dynamic linkages may be replaced with permanent linkages before the network is no longer degradable.

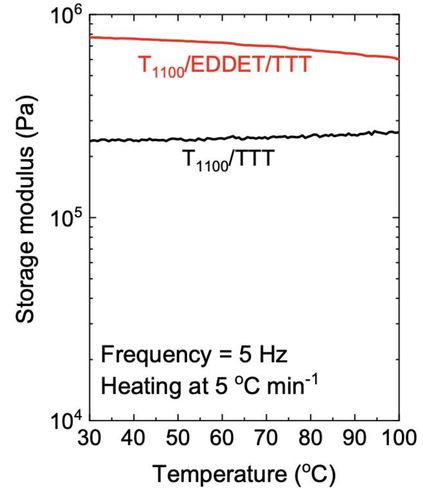

Fig. 3. Difference in storage modulus between purely dynamic film and 50% EDDET film