**Introduction & Background**

Photocured dimethacrylate networks are widely employed in dental medicine, decorative coatings and 3D-lithography. Some of their biggest drawbacks are the limited material properties (roughness, shrinkage) and incomplete conversion. By adding a chain transfer agent (CTA), e.g., thiols[1,2] or preferably allyl sulfones[3], more homogeneous networks with tunable and improved properties are accessible[4,5]. We synthesized mono- and difunctional allyl sulfones and present their high potential in regulating methacrylate networks.

**Free-Radical Polymerization**
- good photoreactivity, fast curing
- convenient low energy processing
- good storage stability
- no control, incomplete conversion
- inhomogeneous and brittle networks

**Thiol-ene chemistry[2]**
- low oxygen inhibition
- fast and complete reaction
- bad storage stability
- strong odor

**Addition-Fragmentation Chain Transfer (AFCT)[2]**
- good photoreactivity
- excellent storage stability
- tunable and homogeneous networks
- hardly any studies on networks

**Synthesis of β-Allyl Sulfones**

**Monomers & Formulations**

**Mechanistic Studies**

**AFCT Mechanism**

**Results & Discussion**

**Photo-DSC & Swelling Experiments**

**Conclusion**

Benefits of β-allyl sulfone chain transfer agents:
- straightforward synthesis from methacrylates
- good storage stability of the formulations
- good coreactivity with methacrylates
- sufficient photoreactivity and higher conversion
- tunable and sharpened glass transition
- high gel fraction and tunable swelling

**References & Acknowledgements**


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