



Functional silicone elastomers via novel siloxane copolymers and chain extenders

Madsen, Frederikke Bahrt; Daugaard, Anders Egede; Hvilsted, Søren; Skov, Anne Ladegaard

Publication date:
2015

Document Version
Peer reviewed version

[Link back to DTU Orbit](#)

Citation (APA):

Madsen, F. B., Daugaard, A. E., Hvilsted, S., & Skov, A. L. (2015). *Functional silicone elastomers via novel siloxane copolymers and chain extenders*. Abstract from Tenth International Workshop on Silicon-Based Polymers, Aussois , France.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Oral abstract

Functional silicone elastomers via novel siloxane copolymers and chain extenders

Frederikke Bahrt Madsen; Anders Egede Daugaard; Søren Hvilsted; Anne Ladegaard Skov

Danish Polymer Center, Department of Chemical and Biochemical Engineering, Technical University of Denmark, Building 227, 2800 Kgs. Lyngby, Denmark

frbah@kt.dtu.dk

Functional silicone polymers and elastomers with altered/improved bulk and/or surface properties are highly desired to expand the application range even further. Novel functional silicone polymers and elastomers were prepared via two different methods. One method was through the synthesis of siloxane copolymers[1] (via the tris(pentafluorophenyl)borane catalysed Piers-Rubinsztajn reaction[2]), which allows for the attachment of functional molecules through copper-catalysed azide-alkyne 1,3-dipolar cycloaddition (CuAAC)[3]. The synthesised copolymers allow for a high degree of chemical freedom, as several parameters can be varied during the preparation phase. As an example, the space between the functional groups can be varied, by using different dimethylsiloxane spacer units between the functional molecules. Furthermore, the degree of functionalisation of the copolymers can be varied accurately by changing the feed of functional molecules. As a result, a completely tuneable elastomer system, with respect to functionalisation, is achieved. The second method of functionalising silicone elastomers involves the synthesis of a so-called ‘chain extender’ that allows for chemical modifications such as CuAAC. This route is promising as an easy-to-use additive to commercial RTV silicone elastomer systems. We have investigated how the different functionalisation variables affect elastomer properties including dielectric and viscoelastic properties.

- [1]. Madsen, F. B. et al "Synthesis of telechelic vinyl/allyl functional siloxane copolymers with structural control *Polymer Chemistry*, 5, 7054-7061 , **2014**.
- [2]. Rubinsztajn, S. and Cella, J. A., "A new polycondensation process for the preparation of polysiloxane copolymers" *Macromolecules*. 38, 1061–1063, **2005**.
- [3]. Madsen, F. B. et al "Silicone elastomers with high dielectric permittivity and high dielectric breakdown strength based on dipolar copolymers *Polymer*, 55, 6212-6219, **2014**.