EVALUATION OF VARIOUS MONOFUNCTIONAL MONOMERS FOR THE DEVELOPMENT OF FRACTURE TOUGH DENTAL MATERIALS CONTAINING AN ABA TRIBLOCK COPOLYMER

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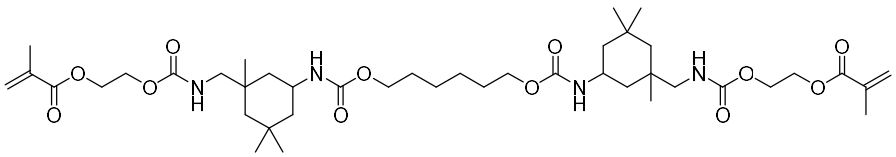
The additive manufacturing of dental protheses by 3D printing requires the formation of materials with excellent mechanical properties and a high fracture toughness. While the applicability of common monofunctional (meth)acrylate monomers in 3D printing is limited due to their low reactivity and high volatility, resins consisting predominantly of multifunctional (meth)acrylates usually result in brittle materials with a high crosslinking density, which are not suitable for the preparation of dentures. Materials with a moderate crosslinking density can be obtained from mixtures of mono- and multifunctional monomers. The addition of block copolymers (BCP) as toughening agents to those resins can significantly improve the fracture toughness of the resulting cured materials.[1]

In order to assess the impact of the monofunctional monomer on the mechanical performance of the resulting materials, the urethane dimethacrylate crosslinker **DMA1** was combined with several monofunctional (meth)acrylates, and a PCL-*b*-PDMS-*b*-PCL triblock copolymer was added as a toughener. The influence of the nature of the monofunctional monomer as well as the concentration of the BCP on fracture toughness, flexural strength and flexural modulus of the cured materials was investigated.



DMA1

References

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