CO2-derived non-isocyanate polyurethane based self-etching dental adhesive system

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Denal adhesives play the main role in the restoration process by making an appropriate bonded interface between tooth cavity and dental composites. So, the development of dental adhesives has considerably affected the clinical applications and efficiency of the dental composites. Self-etching adhesives are generally a mixture of components with acidic functional groups that can diffuse between the collagen fibrils to form micro-retentive resin tags and create the hybrid layer. Here, we reported a new self- etching dental adhesive based on non-isocyanate urethane linkages. The urethane linkages have better hydrolytic stability and also can enhance intermolecular interaction. Hence, we functionalized epoxy monomers with CO2 (as an abundant and inexpensive carbon feedstock) to synthesis the key building block cyclic carbonates. Then through the interaction with amine components we synthesized the monomers/oligomers containing non-isocyanate urethane linkages and acidic moieties. The new self- etching dental adhesive can show appropriate hydrolytic stability and bonding properties.

References

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