A SELF-HEALING, REPROCESSING AND TRANSPARENT PHOTO-CROSSLINKING PDMS ELASTOMER

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Designing self-healing and reprocessing photo-crosslinking PDMS elastomer with good mechanical strength and transparency remains a challenge. In this work, a self-healing and reprocessing dual cross-linking PDMS elastomer was facilely fabricated by successively UV-induced radical photopolymerization between acrylate-functionalized silicone oil (PDMS-AE) and silicone resin (MDT-AE), and thermo-curing between carboxyl- and amido- functionalized silicone oil. The PDMS elastomer showed fleetly photopolymerization rate and conversion, excellent healing efficiency of nearly 100% and recovery efficiency over 90%. Moreover, the elastomer can be repeatedly repaired multiple times with efficiency over 92% and the reprocessing elastomer can also still repair damage with efficiency over 90%. This is all due to the rearrangement of crosslinked networks *via* reversible breakage and reformation of ionic bonds. Besides, transparence and yellowing-resistance of the PDMS elastomer can well endure after multiple thermal-induced repairing and reprocessing process. Consequently, a new inspiration is provided to construct transparent and yellowing-resistant PDMS elastomer with excellent self-healing and reprocessing properties.