Spatiotemporal manipulation of network exchange kinetics of vitrimers using photo-base generator

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Vitrimers with exchangeable dynamic networks have gained much attention not only because they behave similar to thermosets but also owing to their thermoplastic-like properties. An effort to accelerate network exchange kinetics would yield vitrimers with better melt-processability but also with weaker mechanical properties. Consequently, it is challenging to develop strong vitrimers that are also easily weldable and melt-processable. To address this challenge, an approach to spatiotemporally controlling the network exchange kinetics will be presented. This was achieved by incorporating a latent photo-active catalyst, accelerating the network exchange kinetics upon UV exposure. A damaged model vitrimer possessing the catalyst with slow network exchange kinetics could be quickly self-healed and welded on demand via local enhancement of network exchange kinetics by exposing the damaged parts to UV.