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Sustainable epoxy and oxetane thermosets from photo-initiated cationic polymerization.

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A group of sustainable materials are proposed and produced from multifunctional epoxides and oxetanes obtained from renewable sources. Monomers are photopolymerized using diaryliodonium salts designed and synthesized by our group as initiator. A detailed investigation of the network formation of epoxidized linseed oil revealed that crosslinks is markedly dependent to the thickness and viscosity of substrate. Copolymerization studies of difunctional oxetane showed that limonene dioxide was effective in increasing the reaction rates and shorten the inherent induction period, also known as kick-starting effect. Such oxetane thermoset can achieve desirable curing rates and Tg compared to petroleum based epoxy used in applications such as large scale surface coatings.