CATIONIC UV-CURING OF EPOXIDIZED BIOBASED RESINS

Marco Sangermano

Politecnico di Torino, Dipartimento di Scienza Applicata e Tecnologia,
C.so Duca degli Abruzzi 24, 10129 Torino, Italy

Epoxy resins are among the most important building blocks for fabrication of thermosets for many different applications thanks to their superior thermo-mechanical properties and chemical resistance. The recent concerns on the environmental problems and the progressive depletion of petroleum feedstocks have drawn the research interest in finding biobased alternatives. Many curing techniques can be used to obtain the final crosslinked thermoset networks. The UV-curing technology can be considered the most environmentally friendly because of the absence of volatile organic compound (VOC) emissions and mild curing conditions [1].

Studying the reactivity of epoxidized cardanol derivatives, we have demonstrates the high reactivity and potentiality of bio-renewably obtained cardanol-based epoxy monomers as well as the possibility of tuning the final thermomechanical properties by changing either the epoxy content or the chemical structure of the starting photocurable resin [2].

We continued our investigation focusing on the valorization of vegetable oils (VOs) into thermoset materials by using epoxidation of the VOs through the “double bonds to epoxy” synthetic route and the synthesis of crosslinked homopolymers by UV-curing processes achieving the synthesis of 100% biobased EVO thermoset materials whose thermomechanical performances were proved to linearly increase with the EVOs' epoxy content [3].

[1] C. Noè, M. Hakkarainen, M. Sangermano, Polymers, 2021, 13, 89.

[2] C. Noè, S. Malburet, E. Milani, A. Bouvet-Marchand, A. Graillot, M. Sangermano, Polym. Imt., 2020, 69, 668.

[3] S. Malburet, C. Di Mauro, C. Noè, A. Mija, M. Sangermano, A. Graillot, RSC Advances, 2020, 10, 41954.