

From cardanol to biobased polymers : a journey from lab to industry

Sylvain CAILLOL, PhD HDR

Research Director CNRS

sylvain.caillol@enscm.fr

Recent years have witnessed an increasing demand on renewable resource-derived polymers owing to increasing environmental concern and restricted availability of petrochemical re-sources. Moreover, most of thermosetting materials contain aromatic monomers, able to confer high mechanical and thermal properties to the network. Therefore, the access to biobased, non-harmful, and available aromatic monomers is one of the main challenges of the years to come. Cardanol is a naturally occurring phenol, extracted from Cashew nutshell liquid, a non-edible by-product of cashew agro-industry. We proposed a platform approach for the synthesis of various building blocks from cardanol in one or two-steps syntheses. Various routes were used for the synthesis of di- and poly-functional building blocks used thereafter in polymer syntheses. Epoxidation was used to obtain both polyepoxide networks, carbonation led to non-isocyanate polyurethanes. We designed cardanol-based flame-retardant alkyd resin or PVC Plasticizers. Various (meth)acrylate monomers we also synthesized for radical aqueous emulsion polymerization. These polymers have successfully used for industrial applications.