BIO-BASED MONOMERS AND RESINS FOR PHOTOCURABLE COATINGS

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The search for more sustainable materials solutions in society include several different aspects ranging from energy efficient processing techniques to the introduction of new raw materials with a lower carbon footprint. This can in field of coatings technology for example be the combination of UV-curing and new monomers derived from renewable resources. The bio-based monomers can either be retrieved directly from biomass (e.g. vegetable oils or terpenes), or be derived from renewable resources (e.g. itaconic acid, epoxidized vegetable oils, allylated lignin, etc.) [1]. Starting from biomass in some cases allows for totally new combinations of functionalities to be made. It is for example possible to retrieve monomers with both carboxylic acid, alcohol, and epoxy functionalities within the same molecule which would be difficult or tedious to make via conventional synthesis [2], [3], [4]. The use of these type of monomers in resin synthesis also in many cases involve new routes and processing techniques such as the use of sCO_2 as "solvents" [5].

The presentation will address how bio-based monomers and resins can be designed to give formulations with tailorable properties. The systems will be described with respect to curing kinetics, how these monomers homo- and copolymerize, and how the crosslinking chemistry can be adapted to specific functionalities of the resins. A main focus will be on free radical polymerization either using different alkene monomers or combinations thereof by themselves or combinations with different thiol-monomers to enhance the reactivity of the alkenes.

References

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