

March 26-28, 2018
Vienna, Austria

Céline Croutxé-Barghorn et al., Polym Sci, Volume 4
DOI: 10.4172/2471-9935-C1-008

PHOTOBASE GENERATORS: POLYVALENT TOOLS FOR POLYMERIZATION UNDER IRRADIATION

Céline Croutxé-Barghorn, David Perrot, Ahmad Ibrahim and Xavier Allonas

Laboratory of Photochemistry and Macromolecular Engineering, France

Photochemical generation of free radicals and acids is a widely used process in photopolymerization reactions. Recently, photobase generators (PBG) systems have emerged as new source of initiating species allowing the catalysis of different reactions (thiol-Michael, thiol-isocyanate, thiol-epoxy...). The versatility of PBGs will be highlighted through different examples. The process of light-triggered polymerization of dopamine will be first described. Irradiation of quaternary ammonium salts of phenylglyoxylic acid used as photobase generators activates the release of a strong base in water followed by an important pH jump. This initiates the polymerization of dopamine, leading to an on-demand formation of highly adhesive coating on steel. Then, photopolymerization of a thiol/epoxy/isocyanate ternary network was thoroughly investigated. Polymerization kinetics demonstrated that the thiol-isocyanate reaction is completed in a matter of seconds while the thiol-epoxy reaction exhibits a catalytic character over a few days leading to a post-consolidation of the coating. Moreover, the presence of the thiourethane network enhances the thiol-epoxy properties by increasing the

physical cross-linking due to higher content of hydrogen bonding. Compositional variations between thiol/epoxy and thiol/isocyanate and the resulting final thermomechanical properties and hardness offer many advantages in the development of materials with tunable properties.

Biography

Céline Croutxé - Barghorn graduated in chemistry at the University of Bordeaux (France) and the Technische Hochschule of Darmstadt (Germany). She attained her PhD in physical chemistry in 1996 at the University of Haute Alsace (France). Her work focused on the use of photopolymers for the generation of optical elements. She is currently Professor at University of Haute Alsace and head of the research group "Photochemistry in Organic and Hybrid Materials" (POHM) in the Department of Photochemistry. Her present research interest is the study of the photopolymerization processes in hybrid sol-gel glasses, nanocomposites and all organic resins and their characterization for specific applications (coatings or bulk materials).

celine.croutxe-barghorn@uha.fr