PHOTOCURED MATERIALS

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UV-induced polymerization of multifunctional monomers has found a large number of industrial applications, mainly in the production of films, inks and coatings on a variety of substrates including paper, metal and wood. Moreover, it has demonstrated useful for more high-tech applications such as coating of optical fibers and fabrication of printed circuit boards.

Part of the reason for the growing importance of UV-curing techniques, both in industrial and academic research, is a peculiar characteristic that induces fast transformation of a liquid monomer into a solid polymer film having distinctive physical-chemical and mechanical properties. It can be considered environmental friendly owing to the solvent free methodology, and is usually carried out at room temperature, thus conferring added energy saving advantages.

In this seminar I will report different strategies followed by the polymer group at Politecnico di Torino, in Italy, to achieve multifunctionality facing different goals from conductive to photoluminescent UV-cured films, which can find important sensor applications, to hybrid coatings containing graphene which imparts specific properties to the crosslinked material.

Good conductivity was achieved by the *in situ* metal nanoparticles formation through a photo-reduction process. Photo-luminescent UV-cured films were prepared by embedding $Gd_2O_3:Eu^{3+}$ nano-rods in different epoxy matrices obtained through cationic UV-curing or via a click-reaction using photoluminescent dies. Graphene-epoxy polymers were studied to modify mechanical, electrical and barrier properties. Finally some advance in UV-curing technique will be shown where UV-light is employed in miniemulsion and in aerosol polymerization.