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# Novel waterborne nanostructured polymer films filled with imogolite-like alumino germanate nanotubes

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Since the landmark paper of Iijima on the synthesis of carbon nanotubes, tubular materials have been the subject of intensive research due to their unique electronic, mechanical and optical properties. Among them, imogolite nanotubes are attracting increasing attention. Imogolite is a naturally-occurring aluminosilicate mineral of general formula: $(OH)_3Al_2O_3SiOH$ whose structure consists in an outer gibbsite layer curved by the adsorption of orthosilicate tetrahedra in the inner part of the tube. Recently, Levard *et al.* reported the synthesis of Germanate-analogues of imogolite in large quantities and with a good control over tube length and diameter, thereby promoting the development and utilization of such materials.

In this presentation, we report the elaboration of polymer/imogolite hybrid particles using an original surfactant-free emulsion polymerization process. This process is based on the reversible addition fragmentation chain transfer (RAFT) technique, one of the most versatile controlled radical polymerization methods. Poly(acrylic acid) homopolymers or random copolymers of acrylic acid and *n*-butyl acrylate were first synthesized in solution using trithiocarbonate compounds as RAFT agents. These negatively charged macroRAFT agents were subsequently adsorbed on the Ge-imogolite surface and the thiocarbonylthio extremity further reactivated for emulsion polymerization of hydrophobic monomers under starved feed conditions. Depending on the experimental parameters (i.e., the macroRAFT agent composition and molecular weight, the suspension pH, and the nature of the hydrophobic monomers used for emulsion polymerization), discrete polymer latex particles decorating the outer surface of the tubes or an encapsulating polymer shell surrounding small-sized imogolite bundles were obtained. This synthetic method afforded an efficient mean for dispersing imogolite nanotubes into a polymer matrix.

## Biography

Elodie Bourgeat-Lami received a doctor degree from the University of Montpellier (France) in 1991. She is currently research director at CNRS in the Laboratory of Chemistry, Catalysis, Polymers and Processes headed by Pr. B. Charleux and located at the "Ecole Supérieure de Chimie Physique Electronique de Lyon" in Villeurbanne, France. Her research interests are focused on the synthesis and properties of organic/inorganic colloidal materials with special emphasis on radical polymerization in dispersed media, surface functionalization of mineral oxide particles and sol-gel chemistry. She has co-authored 120 papers in peer-reviewed journals, 38 conference proceedings and 7 book chapters.

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