

SL 16

MORPHOLOGY STUDY OF POLYMER HYBRID PARTICLES PREPARED USING TANDEM ROMP AND ATRP IN MINIEMULSION

C. Airaud, E. Ibarboure, V. Héroguez, Y. Gnanou

*Laboratoire de Chimie des Polymères Organiques, UMR CNRS-ENSCP-
Université Bordeaux 1, 16 Av. Pey-Berland, 33607 PESSAC Cedex, France.
airaud@enscpb.fr, heroguez@enscpb.fr*

So as to broaden the scope of their applications in paints, coatings and impact-resistant plastics, many investigations have been dedicated to the preparation of nanostructured polymer colloids over the past decades. Original morphologies including core-shell, hemispherical and complex occluded structures (raspberry-like, golf ball-like, octopus-like...) can now be readily prepared through multi-step syntheses.

We propose here a straightforward **one-pot, one-step, one-catalyst** route to polymer hybrid particles (constituted either of homopolymers blend or of copolymer) based on the simultaneous combination of two mechanistically distinct polymerizations in miniemulsion. Norbornene (NB) and methyl methacrylate (MMA) were converted via **ring-opening metathesis polymerization (ROMP)** and **atom-transfer radical polymerization (ATRP)**, respectively. Depending on the combination fashion (simultaneous homopolymerizations or copolymerization), the prepared particles exhibited various original morphologies as imaged by transmission electron- and atomic force microscopies (Figure 1).

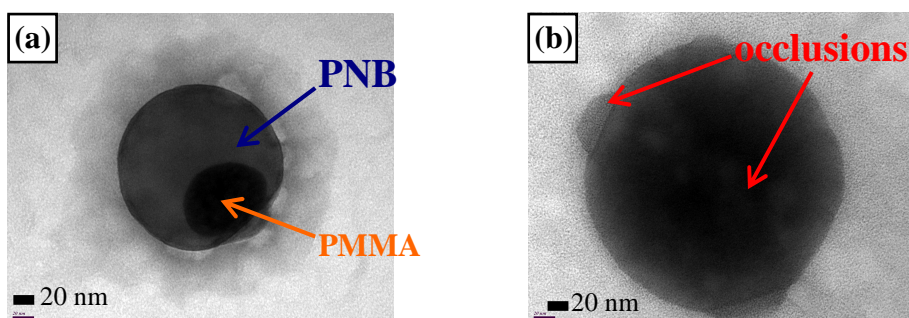


Figure 1. Transmission electron microscopy pictures (staining with ammonium molybdate). **(a)** Phase separation within homo-PNB/homo-PMMA blend particles ($\%_{\text{PNB}} / \%_{\text{PMMA}}$ 50/50). **(b)** Formation of PNB-rich occlusions within PNB-g-PMMA particles ($\%_{\text{PNB}} / \%_{\text{PMMA}}$ 15/85).