

## Synthesis of AgBr nanocomposites templated by amphiphilic PVC-g-P4VP copolymer and their use as olefin carrier for facilitated transport membranes

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A novel amphiphilic comb-like copolymer consisting of poly(vinyl chloride) (PVC) main chains and poly(4-vinyl pyridine) (P4VP) side chains, i.e. PVC-g-P4VP with 65:35 wt% is synthesized via ATRP. This self-assembled copolymer is used to template the growth of AgBr nanoparticles with diameters of 10–50 nm, as characterized by UV-vis, XRD and TEM. Upon introduction of ionic liquid, i.e. 1-methyl-3-octylimidazolium nitrate (MOIM<sup>+</sup>NO<sub>3</sub><sup>-</sup>), the surface of AgBr nanoparticles is more partially positively charged due to the interactions between NO<sub>3</sub><sup>-</sup> ions and the surfaces of nanoparticles, as revealed by FT-Raman and XPS. We also demonstrate the ability of AgBr as a new type of olefin carrier by tuning the interactions of positively charged AgBr with the C=C bond of olefin molecules. As a result, the membranes containing AgBr nanocomposites exhibit highly stable separation performances for propylene/propane mixture, i.e. a mixed gas selectivity of 6 and a permeance of 5.7 GPU.