

Amphiphilic block copolymers for graphene dispersions

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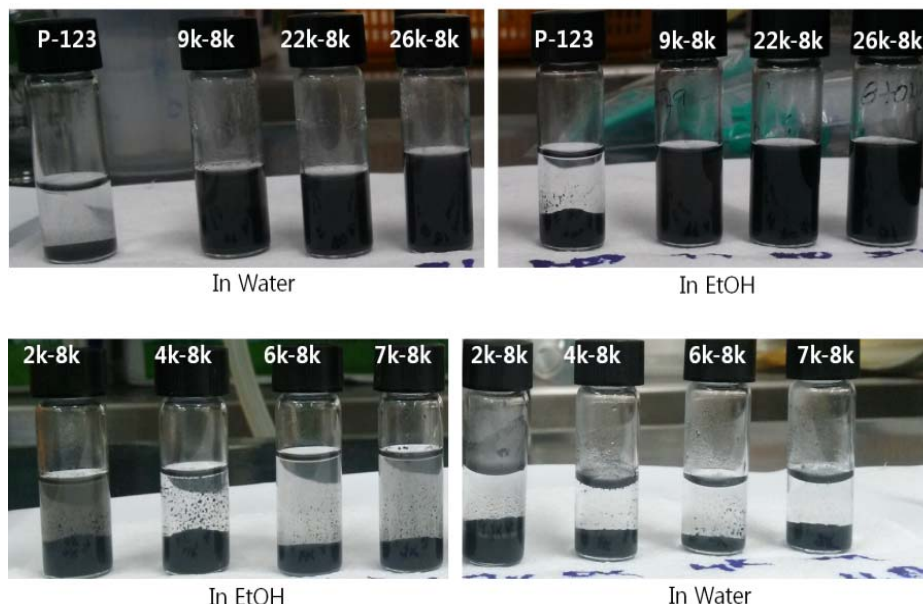
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Abstract Synthesis and characterization of different types of amphiphilic block copolymers and as graphene dispersants in water and ethanol will be presented. Graphene has been the center of attention during past few years with outstanding physical and mechanical properties. Particularly, affording single-layer graphene sheets without structural defects remains as difficult task. This single layer graphene has proved suitable toward various applications.¹ In the present work, different graphene-philic block copolymers, PSt-b-mPEG/PVP-b-mPEG (styrene (St) and vinyl pyridine (VP)), were prepared using reversible addition fragmentation chain transfer polymerization (RAFT). The hydrophobic block lengths (PSt/PVP) are varied whereas hydrophilic length was fixed as 8k PEG. The commercially available graphene M25 was used. The graphenes were dispersed in ethanol and water and characterized using UV-Vis (adsorption spectrum), goniometry (surface tension), and AFM (surface morphology and adhesion energy). The results revealed that the PVP-b-mPEG amphiphilic block copolymer showed good dispersibility of graphene than compared to that of PSt-b-mPEG and P-123. NVC (N-vinylcarbazole) based block copolymers were also prepared and their dispersibility results was presented. (**Acknowledgement:** This work was supported by the Ministry of Trade, Industry and Energy, Grant No. 10044338)

References

[1] Guardia, L.; fernández-Merino, M. J.; Paredes, J. I.; Solís-Fernández, P.; Villar-Rodil, S.; Martínez-Alonso, A.; Tascón, J. M. D. Carbon 49 (2011) 1653.

Figures



PSt-b-mPEG could not stabilize graphene; however, even after 10 days graphene/PVP-b-mPEG did not settle down, showed good dispersions.