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Understanding the mechanical and tribological properties of solution styrene butadiene rubber composites based on partially graphene oxide

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Abstract

Poor dispersion of graphene in non-polar polymer matrices creates composites with limited applications. A method to improve the dispersion of graphene in solution styrene butadiene (SSBR) and butadien rubber (BR) via grafting polystyrene (PS) or poly(styrene-co-isoprene) (PSI) on the surface of graphene oxide (GO) is examined. Composites of SSBR-BR with graphene as well as SSBR-BR with GO-PS (or GO-PSI) were prepared by open-mill mixing and vulcanization. Improved dispersion of GO in SSBR-BR composites substantially increases both the tensile strength and the wear resistance properties compared to neat SSBR-BR composites at low loads. More importantly, the wear test results and corresponding wear mechanisms of the all SSBR-BR composites were discussed at different loads.

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