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Liquid polyurethane (PU) resins are used to form anti-slip surface coatings. In this work, we reinforce PU resin films with few-layer graphene (FLG) nanoparticles incorporated by high-shear mixing. This process gives excellent dispersion as evidenced by optical tomography. The FLG does not appreciably change the tensile strength or Shore hardness of the PU, but we report modest increase of 10% in tear strength and Young's modulus, accompanied by a similar decrease in elongation to failure. However, significant improvement of over 100% is observed in the abrasion resistance. At the same time, we report a 25% increase in the coefficient of static friction and 200% increase in the coefficient of dynamic friction. These results, taken together, suggests that graphene can significantly improve the grip and durability of PU anti-slip coatings, without significantly affecting the other mechanical properties of the coating.

References

- [1] Alberto, M.; et al. High-grip and hard-wearing graphene reinforced polyurethane coatings. *Composites Part B: Engineering*, 2021, 213, 108727

Figures

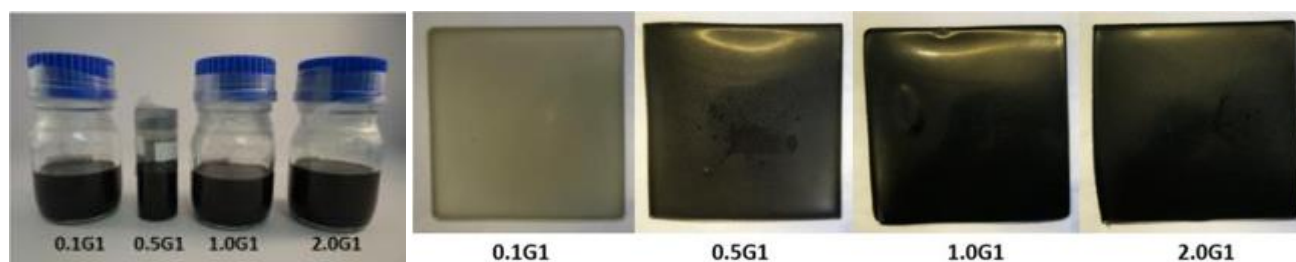


Figure 1: Optical images of graphene-PU composite resins and casted films with different loadings.

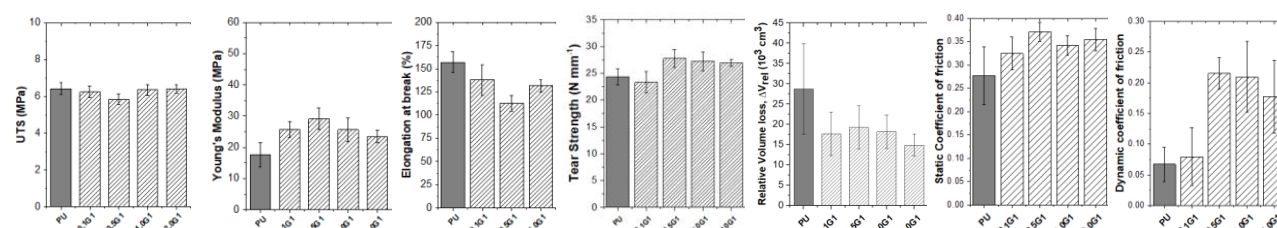


Figure 2: Mechanical property changes in PU resin films upon graphene addition – Ultimate tensile strength, Young's modulus, Ultimate elongation, Tear strength, Abrasion resistance, Coefficient of static friction and Coefficient of dynamic friction.