Nanoscale friction and wear of a polymer coated with graphene

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We investigate how a graphene sheet on top of a semicrystalline polymer polyvinylalcohol affects the friction and wear. Our setup is meant to resemble an AFM experiment with a silicon tip. We have used two different graphene sheets, namely an unstrained, flat sheet, and one that has been crumpled before being deposited on the polymer. The graphene protects the top layer of the polymer from wear and reduces the friction. The unstrained flat graphene is stiffer, and we find that it constrains the polymer chains and reduces the indentation depth.

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