

# Tribological influence due to topological disorder in graphene

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Graphene layer/s are established as robust for mechanical response that may be relevant in various physical applications [1]. Nevertheless, certain sliding interfacial operations were reported where graphene films get compromised [2]. Our recent investigations show the presence of structural disorder like grain boundaries, edge and step edges can alter graphene mechanical and elastic properties. These physical characteristics are prominent and directly appear in tribological applications of graphene at nanoscale. On one side CVD produced graphene layer/s over Ni grain boundary reduces friction forces than grain regions [3]. While edge and step edge enhances the friction force makes it debile material during friction force microscopy, fig.1. These experimental findings are well supported by finite element method. Our findings suggest that graphene mechanical behavior strongly depends on interfacial adhesion with substrate and densities of structural disorder.

## References

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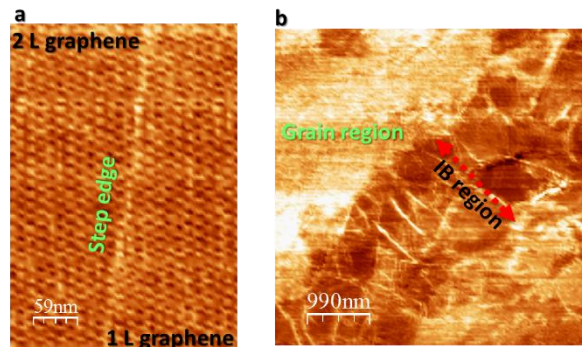


Fig. 1. Atomic force microscopy image: Friction force (a) mechanically exfoliated graphene on silica of 1 and 2 layers (b) CVD produced graphene on polycrystalline Ni shows friction from grain and interfacial grain boundaries.