Edges-stress induced warping and rippling of graphene sheets and nanoribbons

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Graphene, an atomic layer of carbon atoms arranged in a honeycomb lattice, is actively being pursued as a material for next-generation electronics because of the high mobility of charge carriers and the potential to control their density by applying a gate voltage.

Using atomic scale simulations a team led by Brown researchers [1] have shown that intrinsic stresses arising from the presence of edges can lead to large scale bending, twisting and warping of both free standing (Figure 1) and supported graphene sheets (Figure 2).

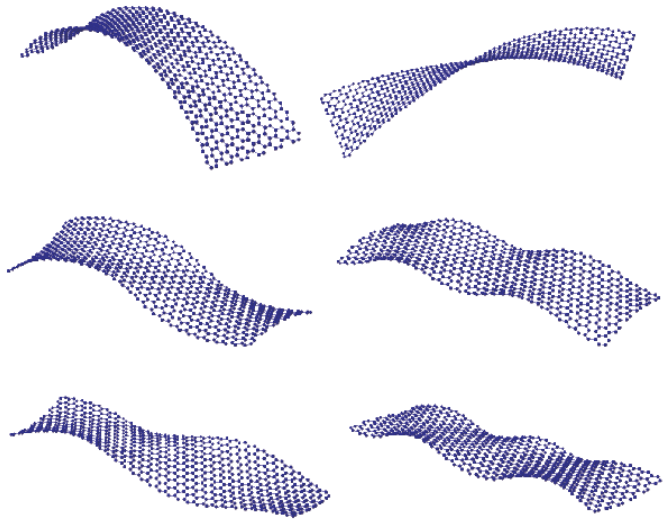

Figure 1

Because of the close connection between strain, curvature, and electronic structure, this work suggests means to control morphology and hence the electrical and magnetic properties of graphene sheets and nanoribbons by engineering the edge stresses, for example, by doping or functionalizing the edges.

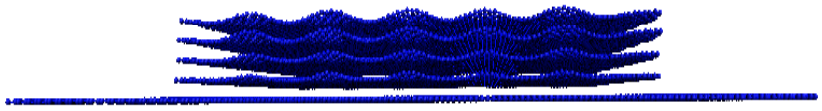

Figure 2

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Industry Collaboration –

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