Abstract Submitted
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**Graphene-based bimorphs for the fabrication of micron-sized, autonomous origami machines.**[1] MARC MISKIN, KYLE DORSEY, BARIS BIRCAN, MICHAEL REYNOLDS, PETER ROSE, ITAI COHEN, PAUL MCEUEN, Cornell University — We present a new platform for the construction of micron sized origami machines that change shape in fractions of a second in response to environmental stimuli. The enabling technology behind our machines is the graphene-glass bimorph. We show that graphene sheets bound to nanometer thick layers of glass are ultrathin actuators that bend in response to small strain differentials. These bimorphs can bend to micron radii of curvature using strains that are two orders of magnitude lower than the fracture strain of graphene. By patterning thick rigid panels on top of bimorphs, we localize bending to the unpatterned regions to produce folds. Using panels and bimorphs, we can scale down existing origami patterns to produce a wide range of machines. These machines can sense their environments, respond, and perform useful functions on time and length scales comparable to microscale biological organisms.

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