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Nano-Engineering Defect Structures on Graphene[1] MARK LUSK, LINCOLN CARR, Department of Physics, Colorado School of Mines — We present a new way of nano-engineering graphene using defect domains. These regions have ring structures that depart from the usual honeycomb lattice, though each carbon atom still has three nearest neighbors. A set of stable domain structures is identified using density functional theory (DFT), including blisters, ridges, ribbons, and meta-crystals. All such structures are made solely out of carbon; the smallest encompasses just 16 atoms. Blisters, ridges and meta-crystals rise up out of the sheet, while ribbons remain flat. In the vicinity of vacancies, the reaction barriers to formation are sufficiently low that such defects could be synthesized through the thermally activated restructuring of coalesced adatoms. These defect domains may offer technological applications associated with the confinement and transport of charge.

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