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Graphane: a two-dimensional hydrocarbon JORGE SOFO, AJAY CHAUDHARI, GREG BARBER, Penn State — We predict the stability of a new *extended two-dimensional hydrocarbon* on the basis of first-principles total energy calculations. The compound that we call graphane is a fully saturated hydrocarbon derived from a single graphene sheet with formula CH. All of the carbon atoms are in sp^3 hybridization forming a hexagonal network and the hydrogen atoms are bonded to carbon on both sides of the plane in an alternating manner. Graphane is predicted to be stable with a binding energy comparable to other hydrocarbons such as benzene, cyclohexane, and polyethylene. We discuss possible routes for synthesizing graphane and potential applications as a hydrogen storage material and in two dimensional electronics.

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