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Gapped Dirac cone in silicene and germanene on Al$_2$O$_3$(0001)
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vveloping guidelines to find promising substrates that can stabilize the monolayer
honeycomb structures of silicene and germanene while simultaneously preserving the
Dirac-electron-driven properties is of practical importance for applications. From
first-principles calculations, we find that silicene on Al-terminated Al$_2$O$_3$(0001) re-
tains the main structural profile of the ideal low-buckled silicene with a binding
energy comparable to that of silicene on Ag(111). Unfolded $k$-projected bands re-
veal that a gapped Dirac cone is formed at the K point. The underlying mechanism
is that the substrate has a large energy gap and the workfunctions are such that
there is little direct bonding of between the silicene Dirac states and the substrate,
which further guides us to find gapped Dirac states in germanene on Al$_2$O$_3$(0001).

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