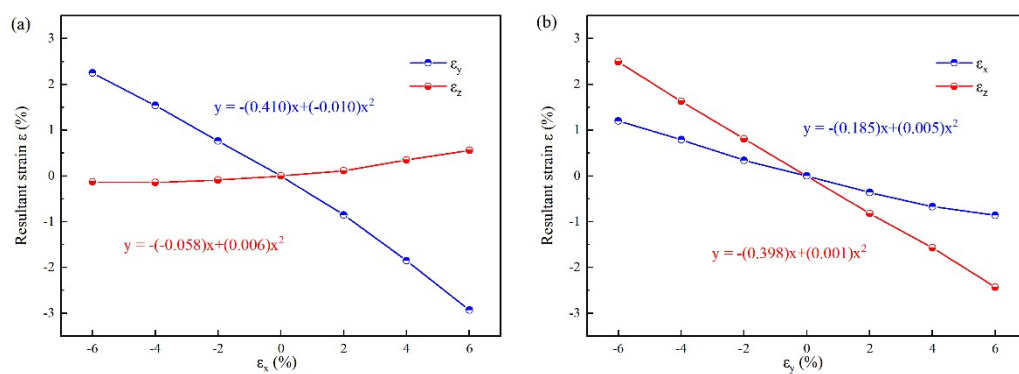
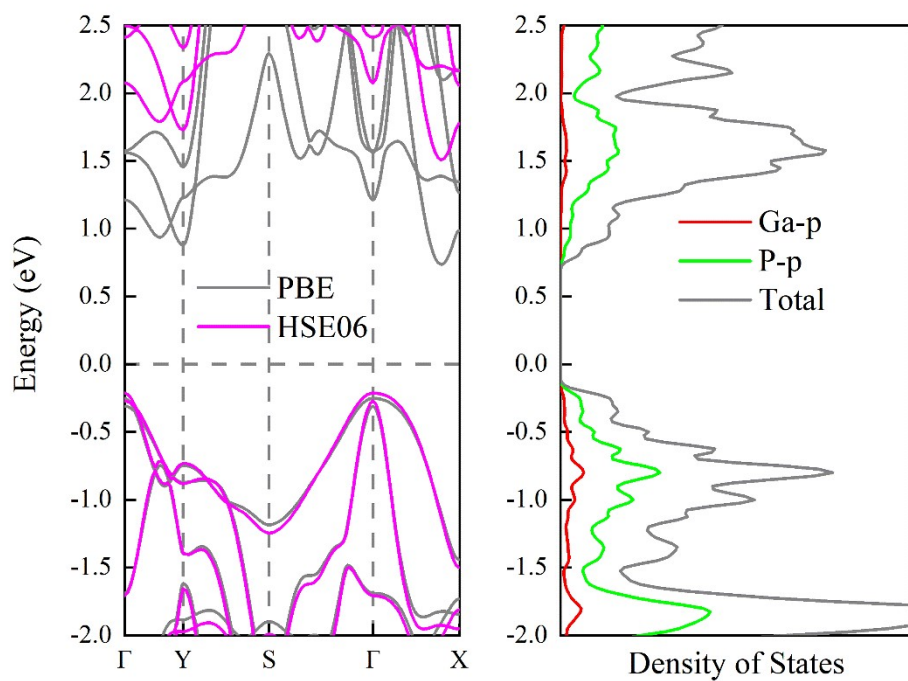


**Figure S1.** (a) Phonon spectra of monolayer GaP<sub>5</sub>. The (b) top and (c) side views of the snapshots from the AIMD simulation for monolayer GaP<sub>5</sub>.



**Figure S2.** Mechanical response of monolayer GaP<sub>5</sub> under uniaxial strain along the (a) x-direction and y-direction.



**Figure 6.** The band structure (PBE and HSE06) and density of states of monolayer GaP<sub>5</sub>.