Supporting Information for

"Electronic and photochemical properties of hybrid binary silicon and germanium derived Janus monolayers"

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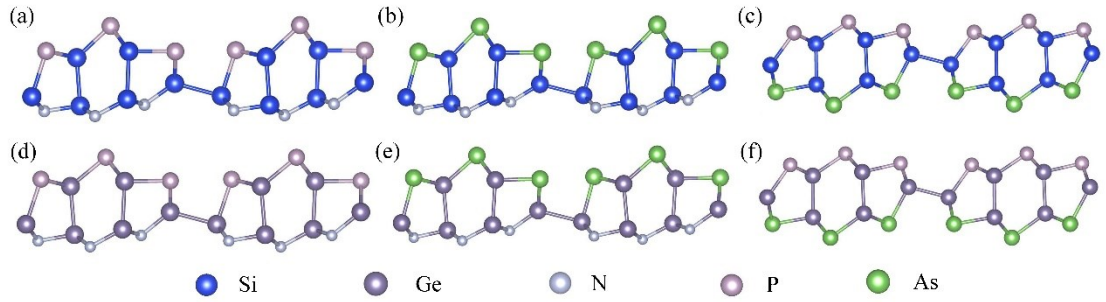

Fig. S1 The side view of optimized lattice structures of (a) Si_2NP, (b)Si_2NAs, (c) Si_2PAs, (d) Ge_2NP (e) Ge_2NAs and (f) Ge_2PAs.

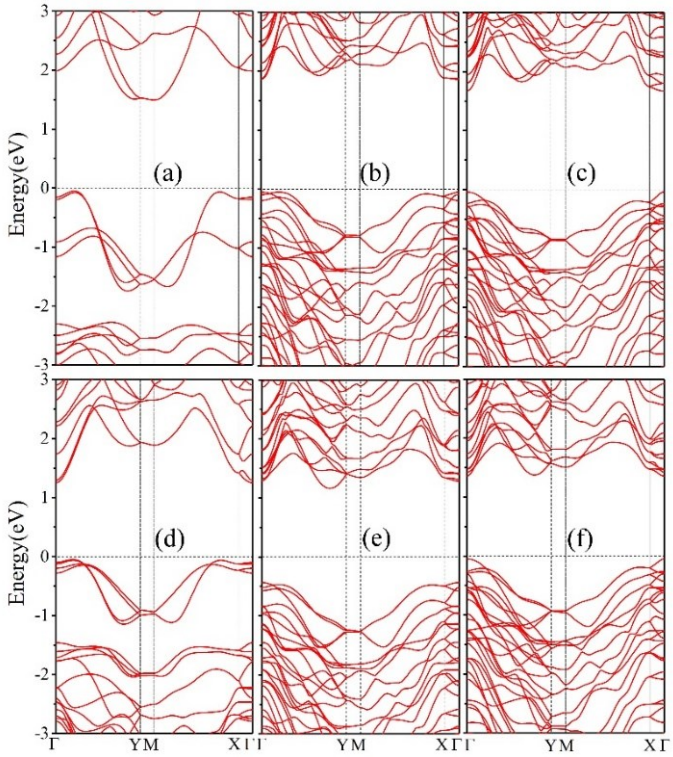

Fig. S2 Band structures of ML (a) SiN, (b)SiP, (c) SiAs, (d) GeN,(e) GeP and(f) GeAs calculated at the theory level of PBE. The horizontal dash line located at 0 eV represents the Fermi level.

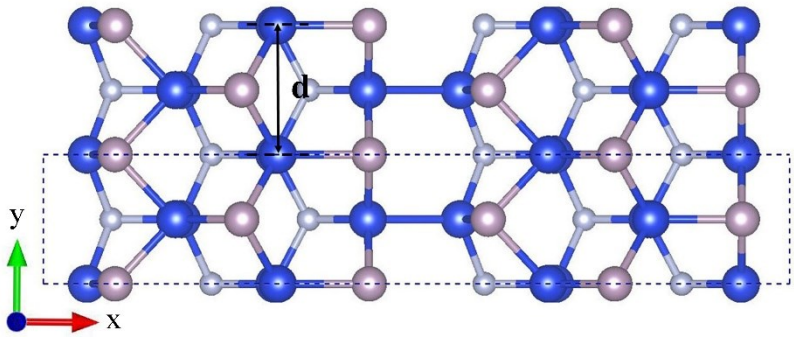

Fig. S3 Top view of ML Si_2NP, d is the distance of neighboring Si atoms.

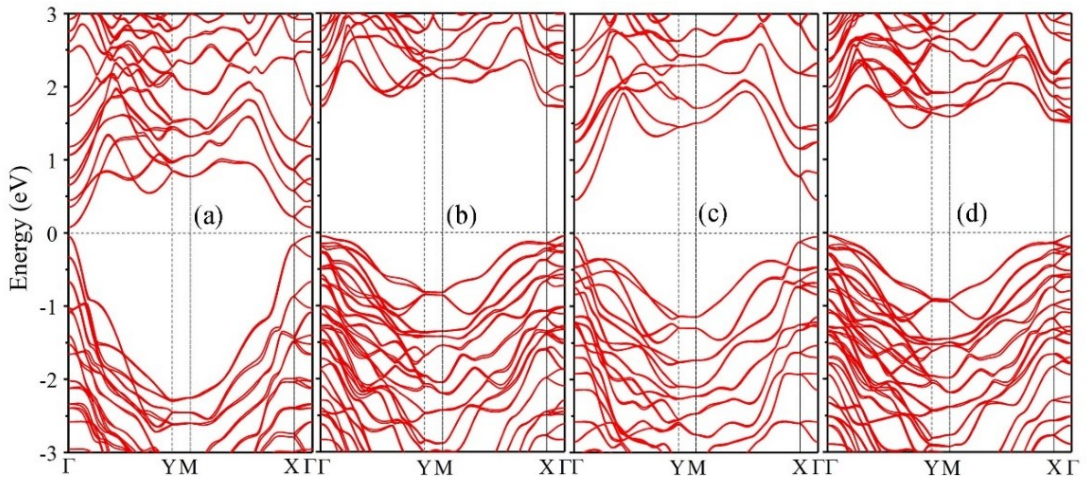

Fig. S4 Band structures of ML (a)Si_2NAs, (b) Si_2PAs, (c) Ge_2NP and (d) Ge_2PAs calculated at the theory level of PBE+SOC. The horizontal dash line located at 0 eV represents the Fermi level.

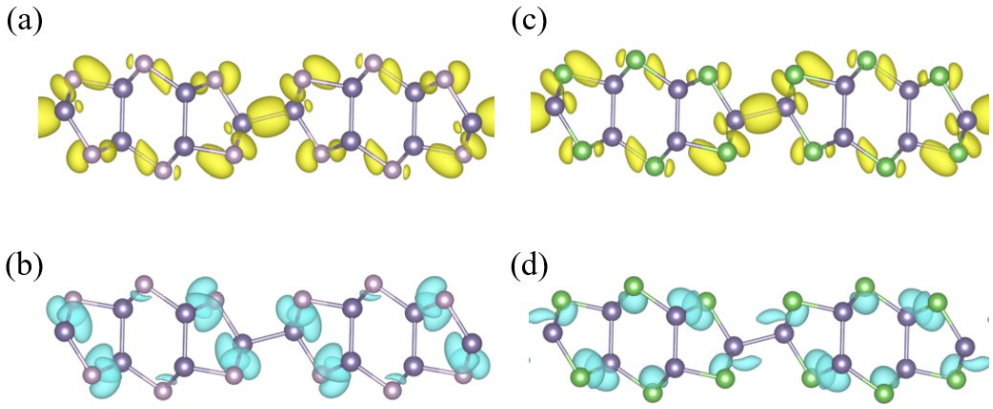

Fig. S5 Partial charge densities of GeP: (a) CBM, (b) VBM and GeAs:(c) CBM, (d) VBM with an isosurface of0.002 $eÅ^{-3}$.