Supplementary Materials

Theoretical prediction of spin-orbit coupling and valley spin splitting in two-dimensional Janus $MSiGeZ_4$ (M=Cr, W; Z=N, P, As)

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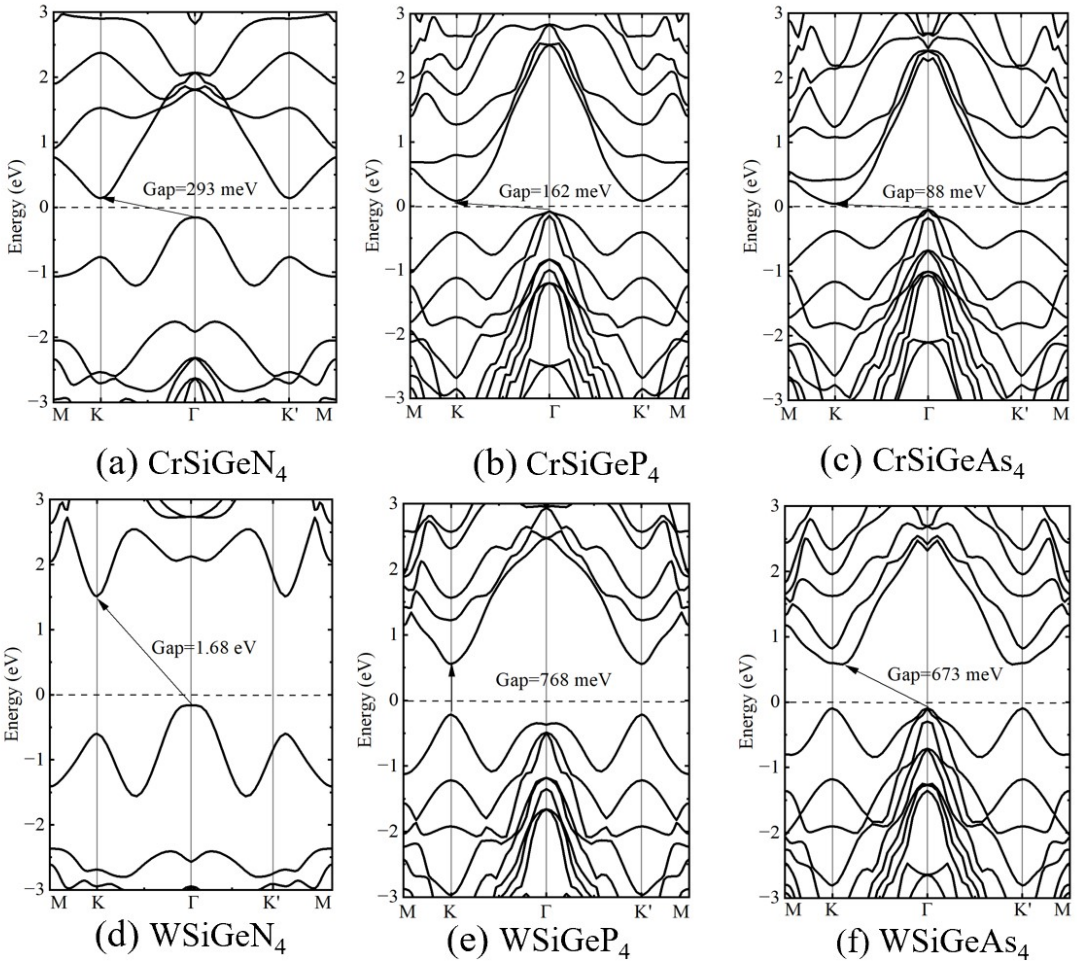

(a) $CrSiGeN_4$ (b) $CrSiGeP_4$ (c) $CrSiGeAs_4$

(d) $WSiGeN_4$ (e) $WSiGeP_4$ (f) $WSiGeAs_4$

Fig. S1: (a-f) 2D Janus $MSiGeZ_4$ (M=Cr, W; Z=N, P, As) energy band diagrams without considering SOC.

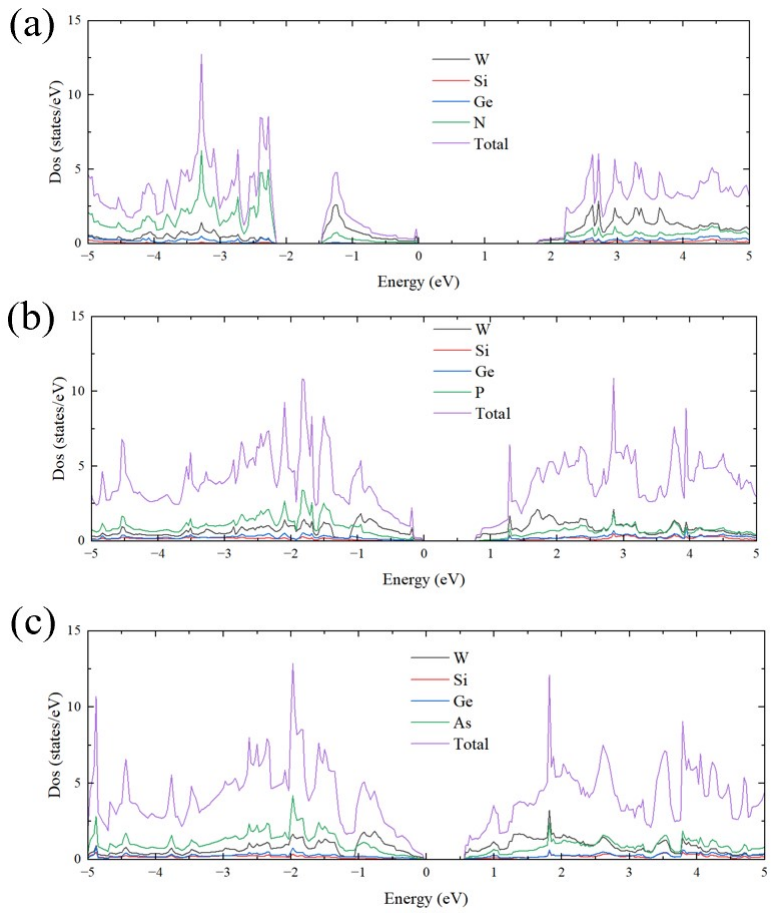

Fig. S2: Plot of total and local density of states for 2D $WSiGeZ_4$ (Z=N, P, As).

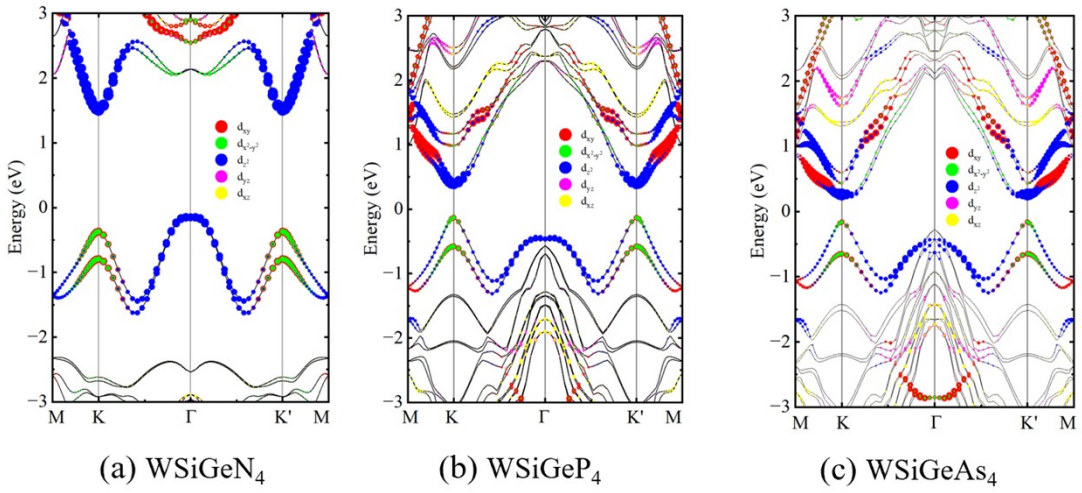

Fig. S3: Atomic orbital projection of 2D $WSiGeZ_4$ (Z=N, P, As).

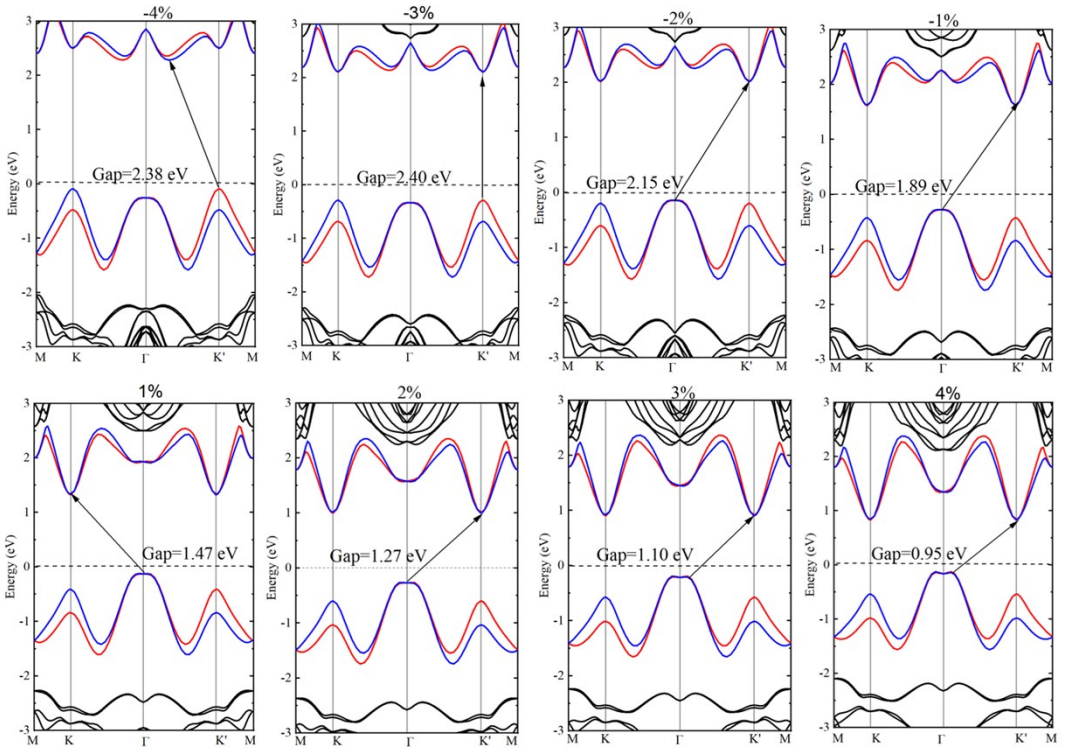

Fig. S4: Energy band diagram of biaxial strain on 2D $WSiGeN_4$ modulation.

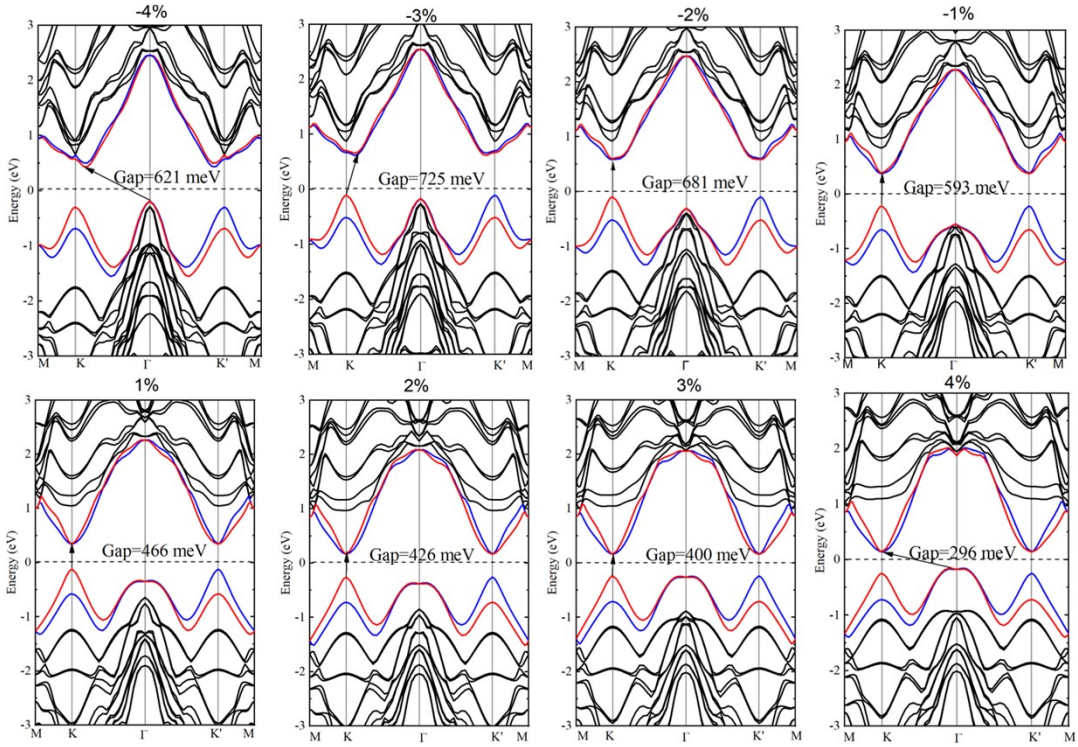

Fig. S5: Energy band diagram of biaxial strain on 2D $WSiGeP_4$ modulation.

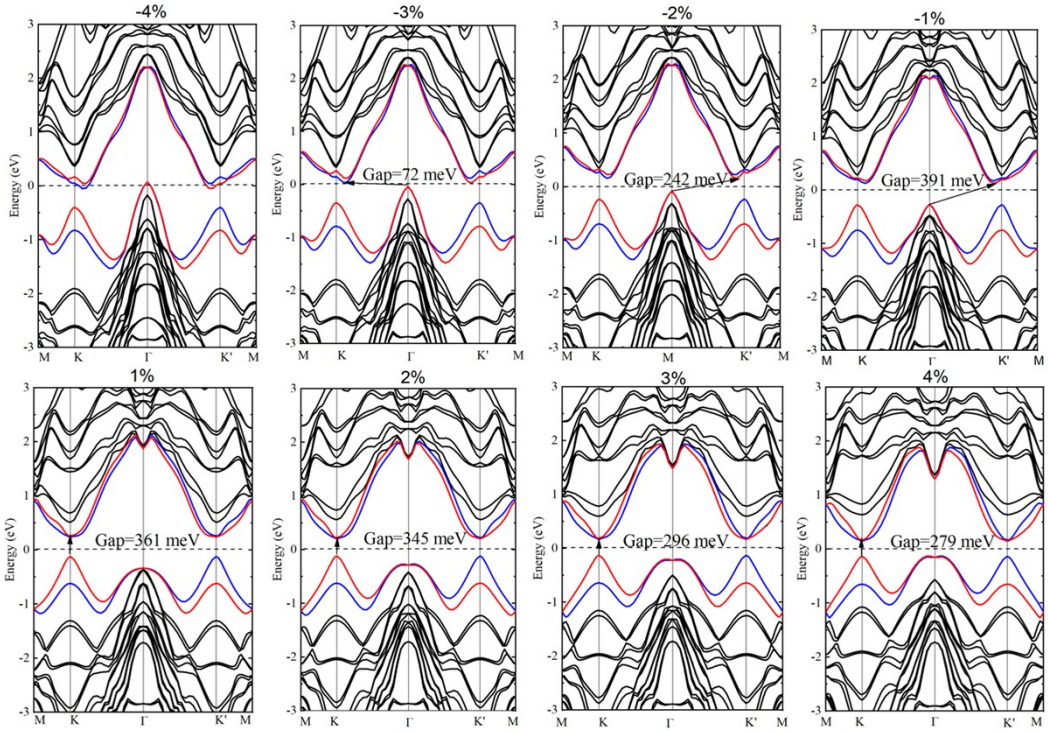

Fig. S6: Energy band diagram of biaxial strain on 2D $WSiGeAs_4$ modulation.