Supplementary Material

Bimetal Chalcogenides $TM_2TM'X_4$ Monolayer: Stable Room Temperature Ferromagnetic Semiconductors

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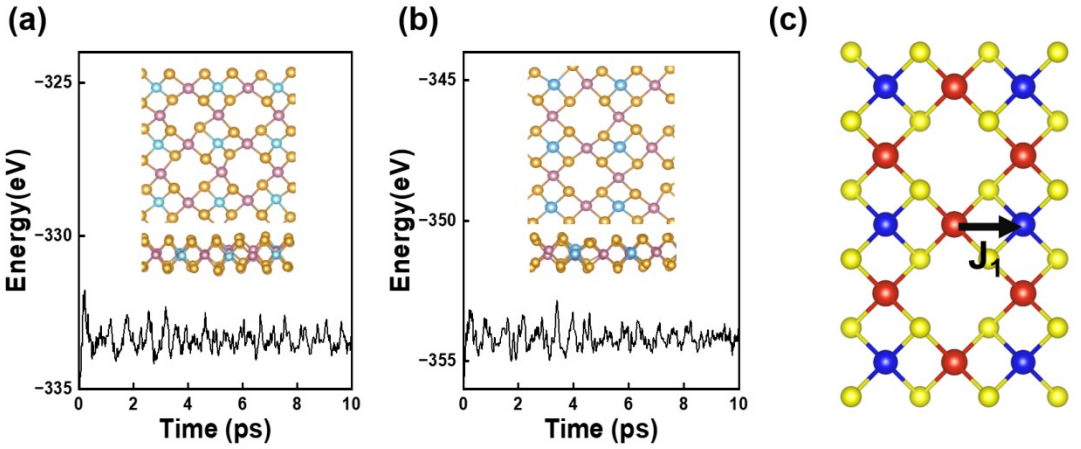

Fig. S1 AIMD snapshots (top and side views) of V_2NiTe_4 (a) and V_2NiTe_4 (b) monolayers. (c) Schematic diagram of exchange interaction.

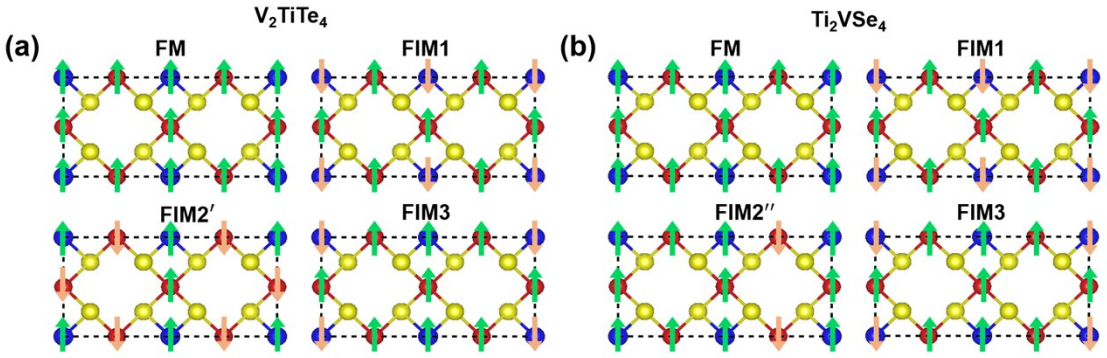

Fig. S2 Considered magnetic configurations for V_2TiTe_4 (a) and Ti_2VSe_4 (b) monolayers.

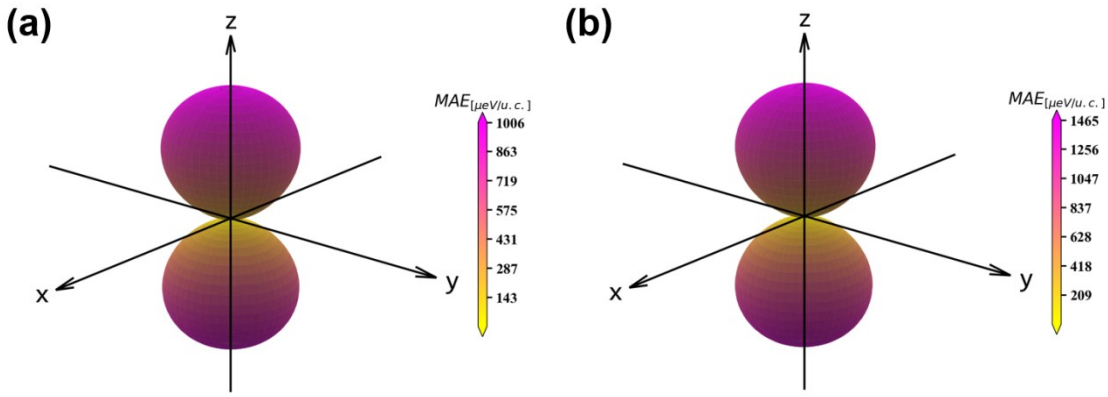

Fig. S3 The calculated MAEs of V_2TiTe_4 (a) and Ti_2VSe_4 (b) monolayers.

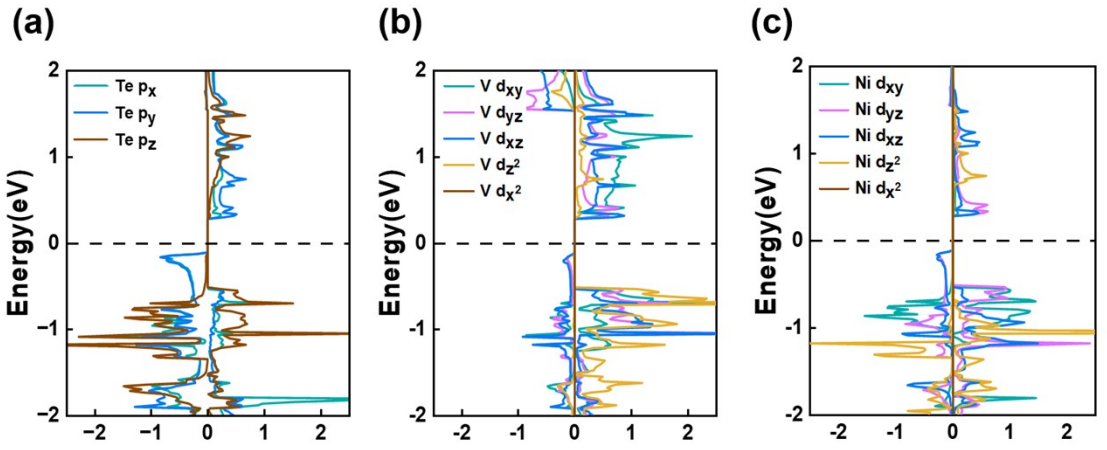

Fig. S4 Projected density of states (PDOS) for Te-*p* (a), V-*d* (b) and Ni-*d* (c) orbitals in the V_2NiTe_4 monolayer.

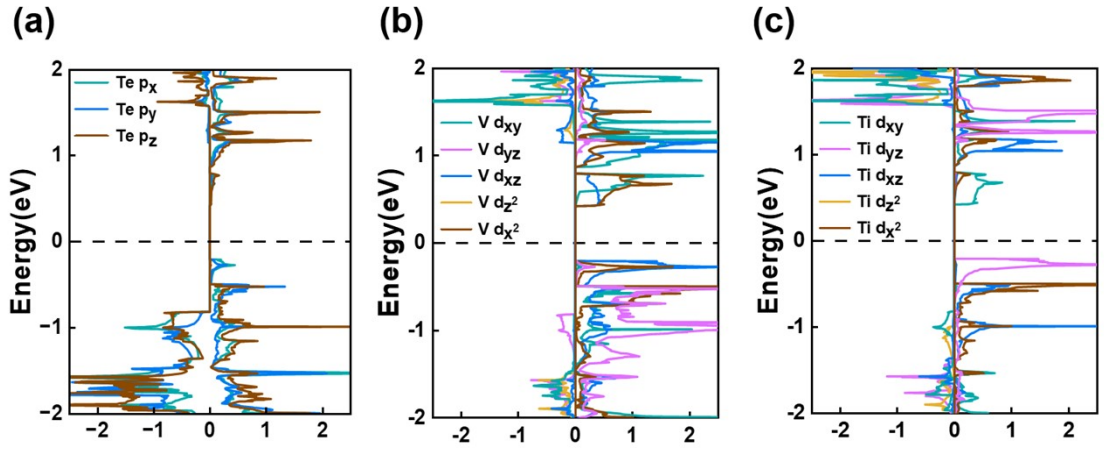

Fig. S5 Projected density of states (PDOS) for Te-*p* (a), V-*d* (b) and Ti-*d* (c) orbitals in the V_2TiTe_4 monolayer.

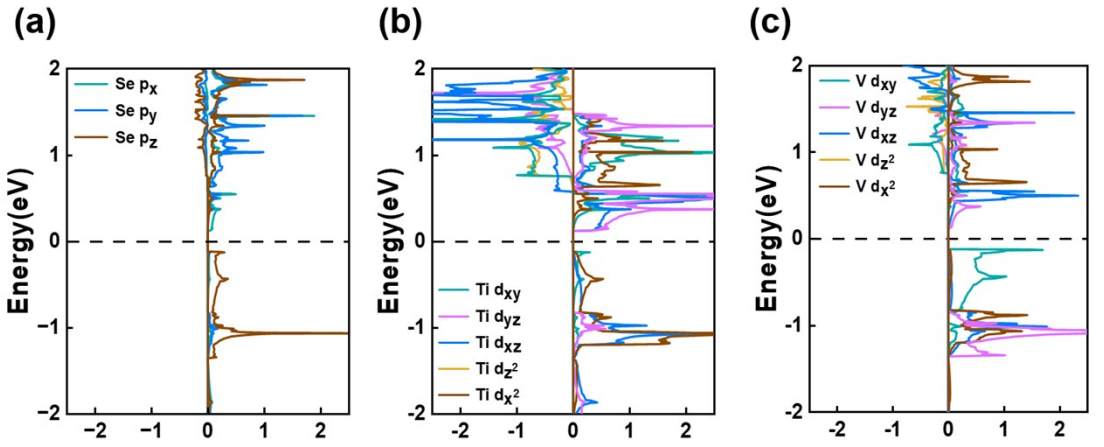

Fig. S6 Projected density of states (PDOS) for Se-*p* (a), Ti-*d* (b), and V-*d* (c) orbitals in the Ti_2VSe_4 monolayer.

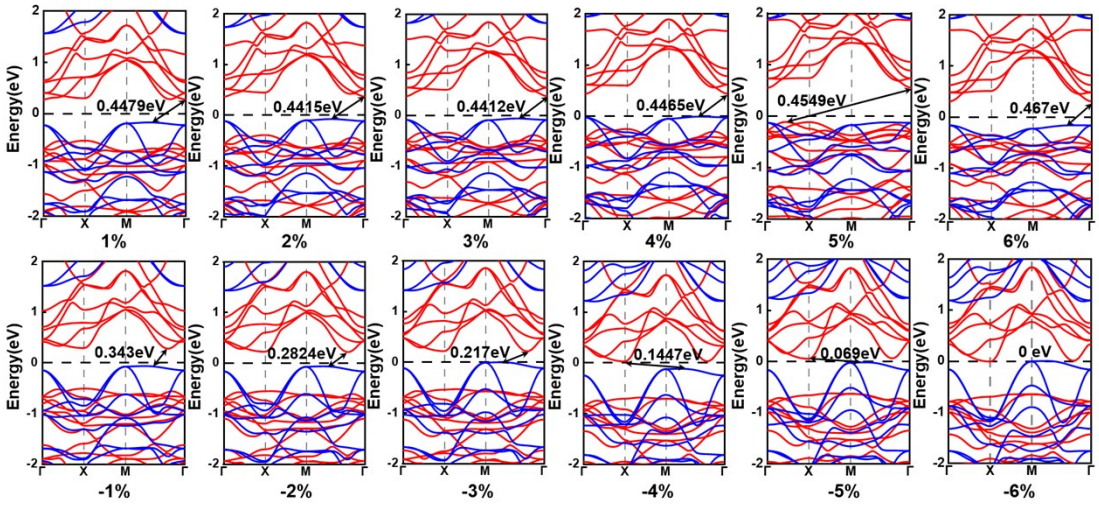

Fig. S7 Band structures of V_2NiTe_4 monolayer under tensile and compressive strains

from -6% to 6%.

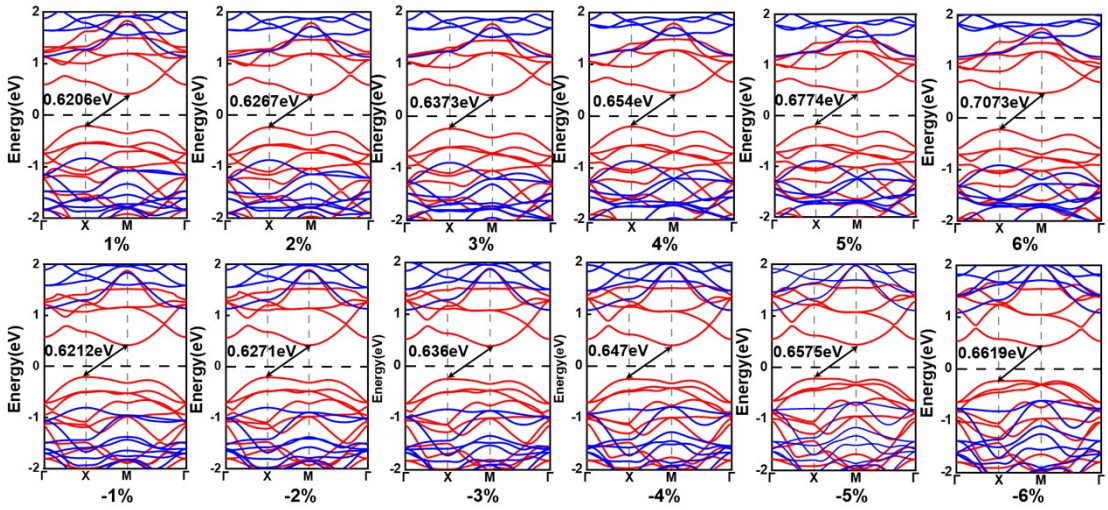

Fig. S8 Band structures of V_2TiTe_4 monolayer under tensile and compressive strains from -6% to 6%.

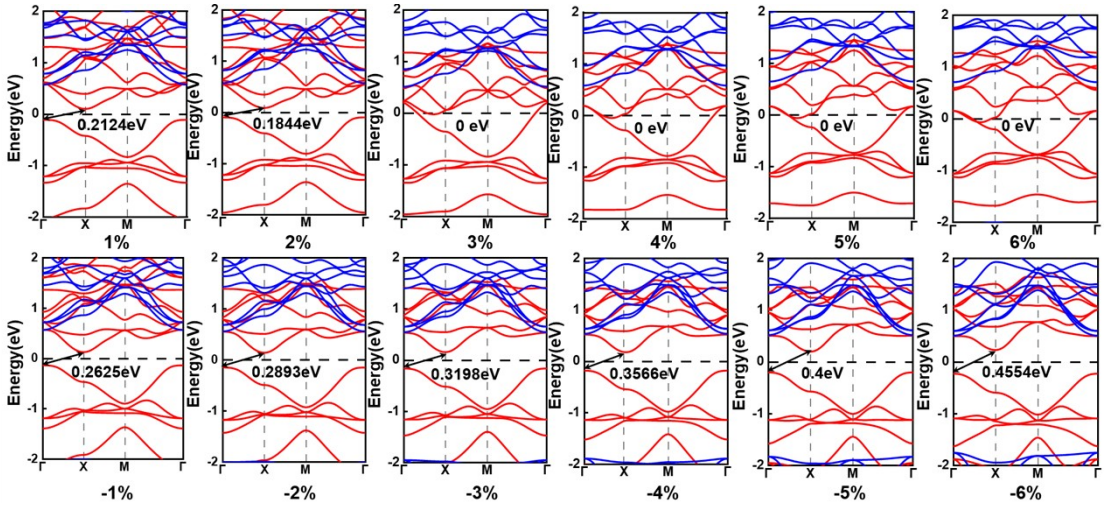

Fig. S9 Band structures of Ti_2VSe_4 monolayer under tensile and compressive strains from -6% to 6%.