iScience, Volume *25*

Supplemental information

Tuning the size of skyrmion by strain at the Co/Pt_3 interfaces

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Supplementary Materials

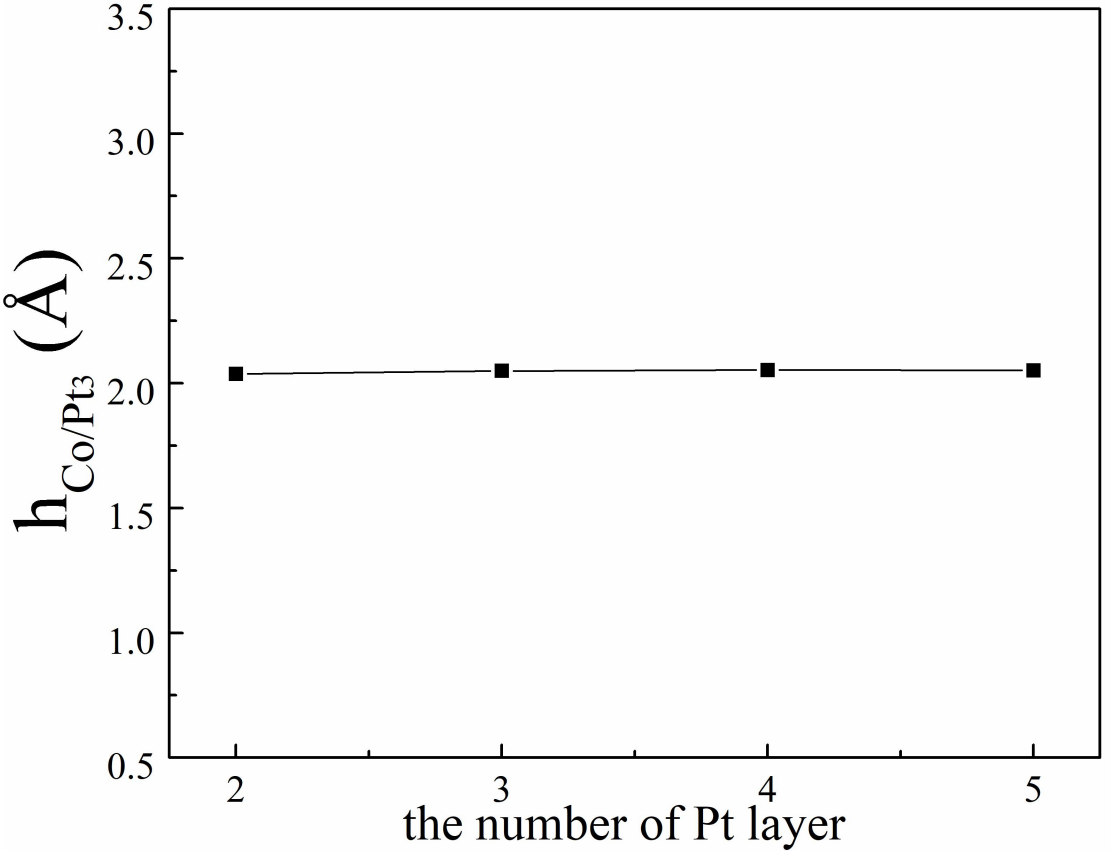

Figure S1 Distance at z-axis between Co atom and adjacent Pt atom at different Pt layer at the lattice constants 2.72Å and the distance remains the same. Related to Figure 1.

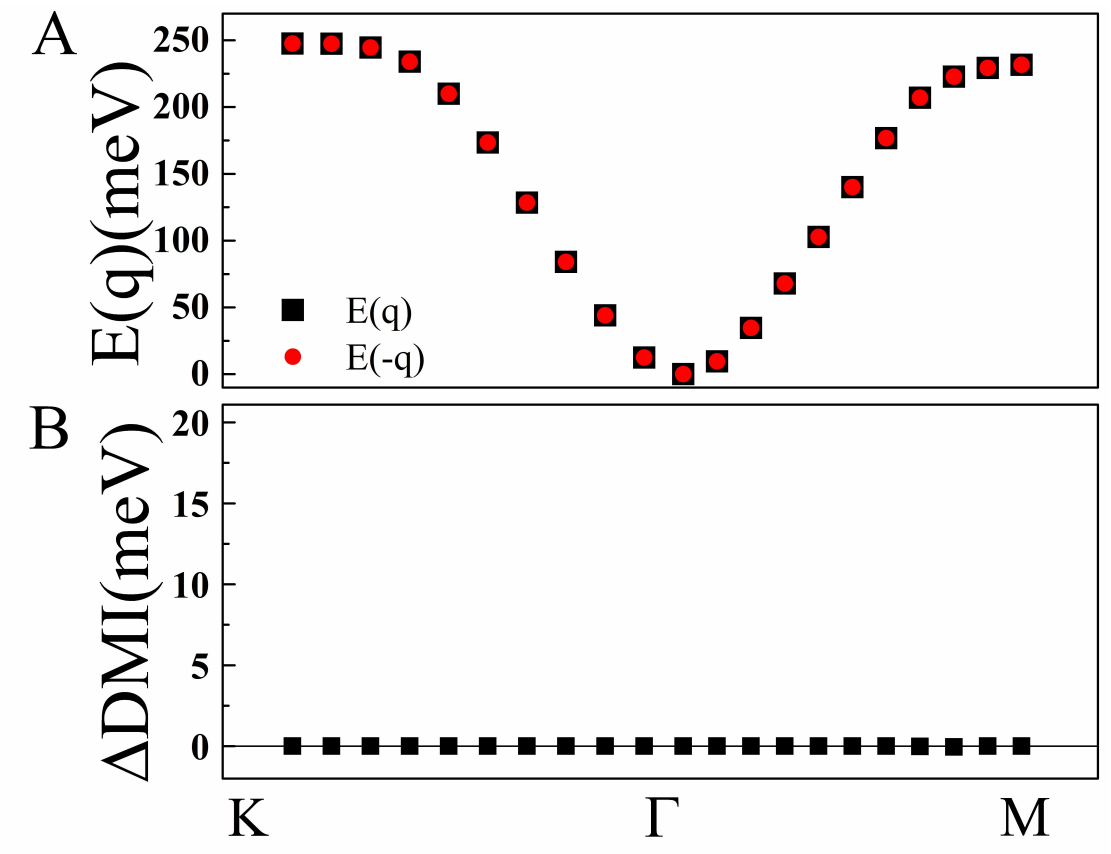

Figure S2 Energy dispersion regardless of spin-orbit coupling. Related to Figure 2. (A) Calculated energy dispersion E(q) and E(-q) of spin spirals at lattice constants of 2.72Å regardless of spin-orbit coupling. (B) Δ DMI(q) regardless of spin-orbit coupling, gotten from the energy differences between E(q) and E(-q). Regardless of spin-orbit coupling, DMI will not appear. In (A) and (B), lines are fitted ones. K, Γ and M are special k-points in first Brillouin zone shown in Figure 1.

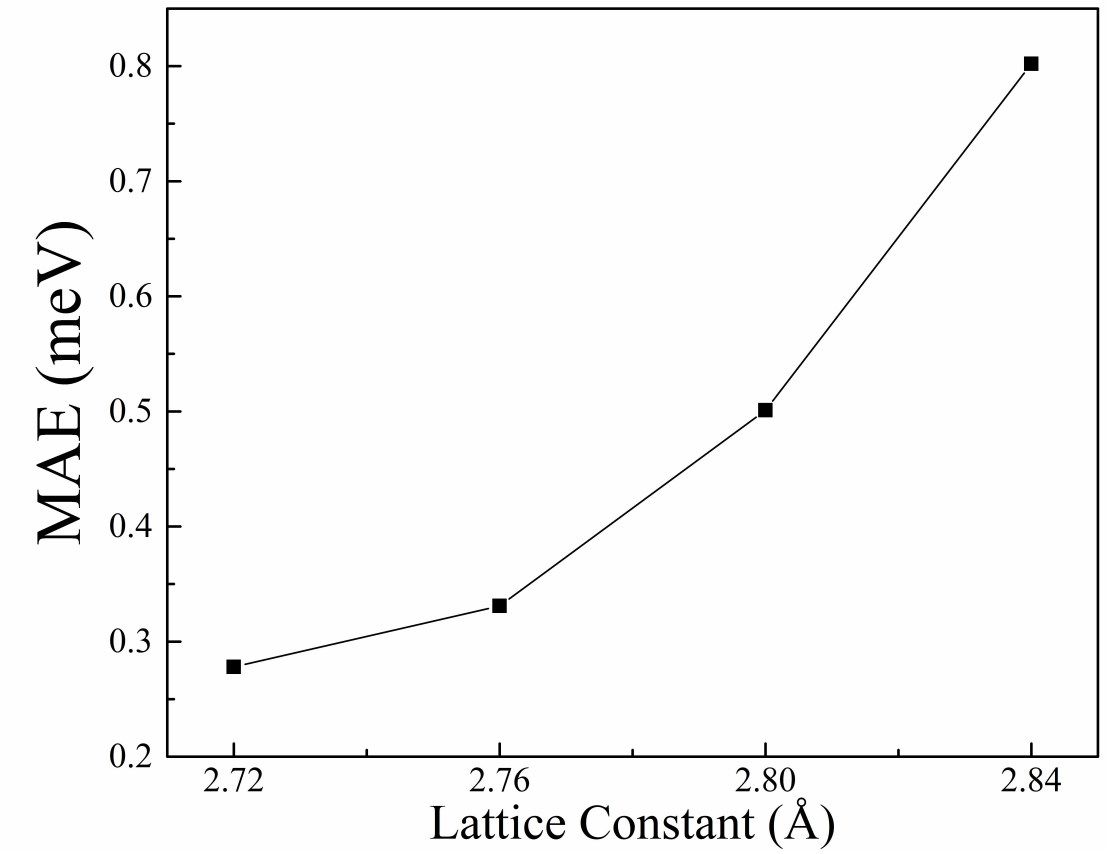

Figure S3 Magnetic anisotropy energy of $CoPt_3$ at lattice constants of 2.72Å, 2.76Å, 2.80Å and 2.84Å respectively and the spin-orbit coupling enhances under strain. Related to Figure 7.

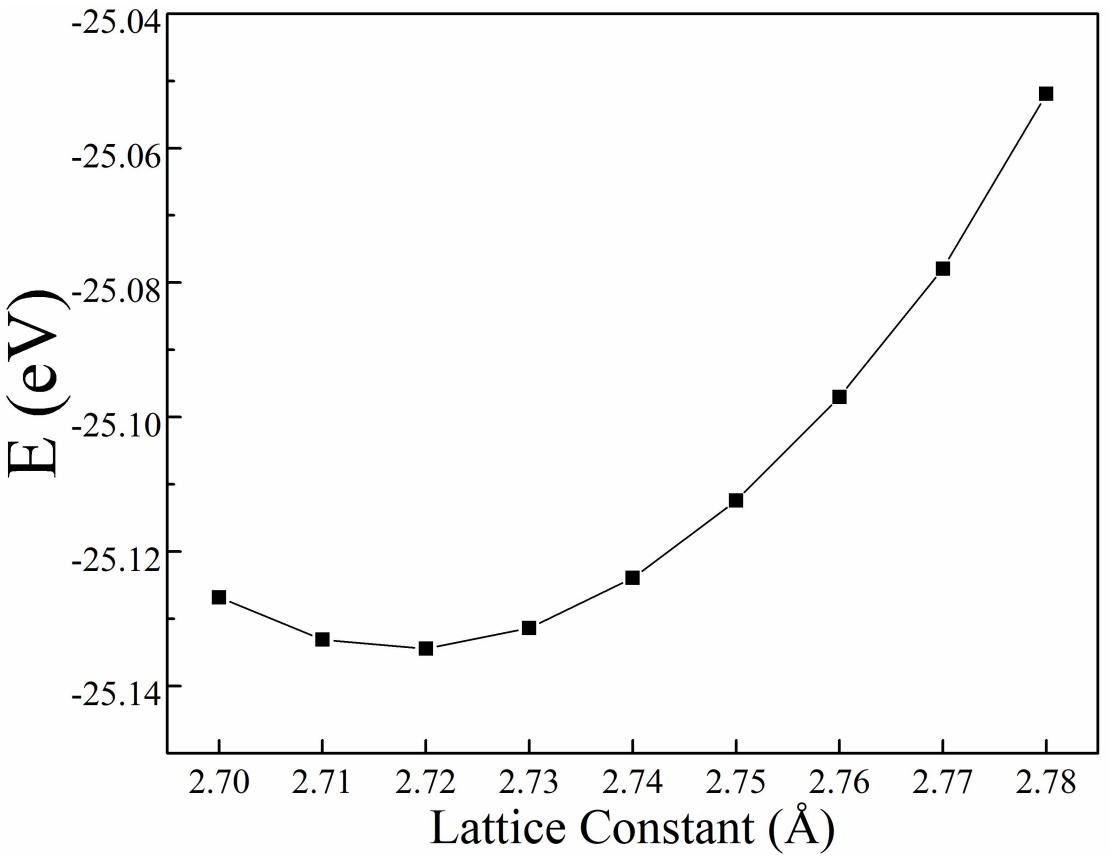

Figure S4 Calculated energy dispersion at lattice constants of 2.70Å to 2.78Å respectively in Co/Pt_3 and at the lattice constants of 2.72Å, the calculated energy is minimal. Related to STAR Methods.

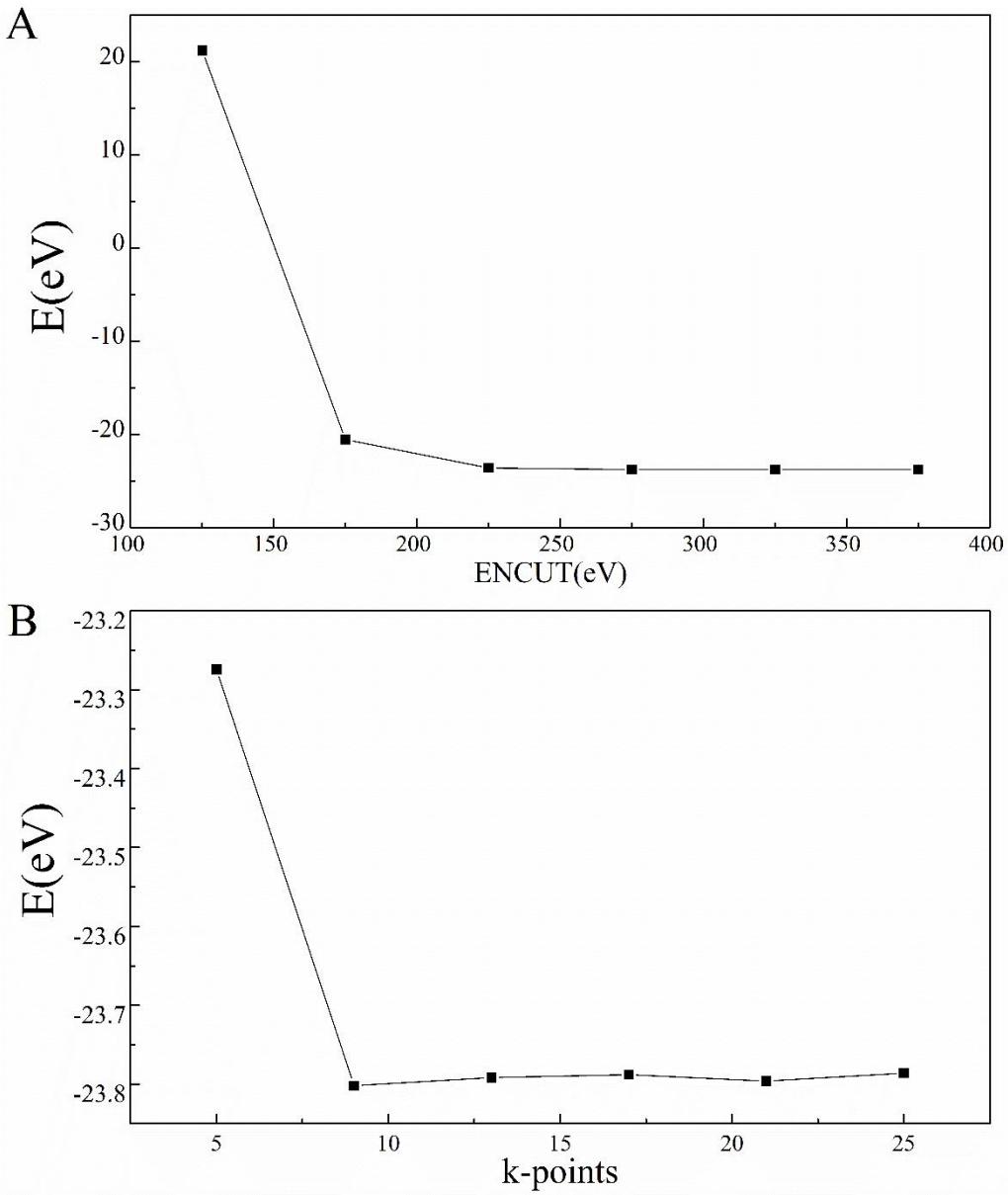

Figure S5 Calculated energy dispersion. Related to STAR Methods. (A) Energy dispersion at the different energy cutoff of 325, 275, 225, 175, 125eV. We set the ENCUT at 375eV, which is 100 eV larger than the suggested highest energy cutoff 280eV, to extend the plane wave function. (B) Energy dispersion at the different k-point of 5×5×1, 9×9×1, 13×13×1, 17×17×1, 21×21×1, 25×25×1 respectively. The energy dispersion is converged at the k-point of 11×11×1 and we set the k-points as 41×41×1 to make the calculations more accurate.