Supplemntary Information

Effect of defects on ballistic transport in a bilayer SnS_2 based junction with Co intercalated electrodes

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Figure S1 presents the band structure of a double-layer SnS_2 with a cobalt atom intercalated, featuring lattice constants of 7**a**×2**b**. As observed in the figure, all impurity levels are situated below the Fermi level. Moreover, the impurity states closest to the Fermi level exhibit flat bands, indicating more localized characteristics.

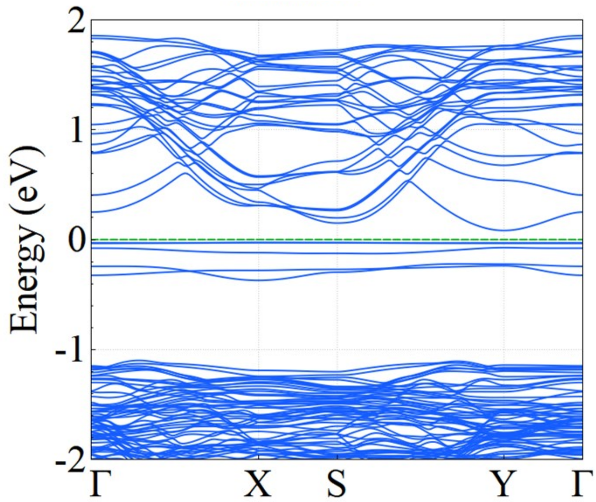

Figure S1 Band structure of double-layer SnS_2 with a cobalt atom intercalation.

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To further investigate the influence of defect concentration on the characteristics and transport properties of the junction, we here consider half the defect concentration mentioned in the main text. Figure S2 presents the projected density of states (PDOS) and transmission spectra with the defect located at the center of the scattering region. It is evident from the PDOS that the defect concentration has a minimal impact on the potential barrier Φ. However, it significantly affects the transmission, with a lower concentration resulting in reduced tunneling.

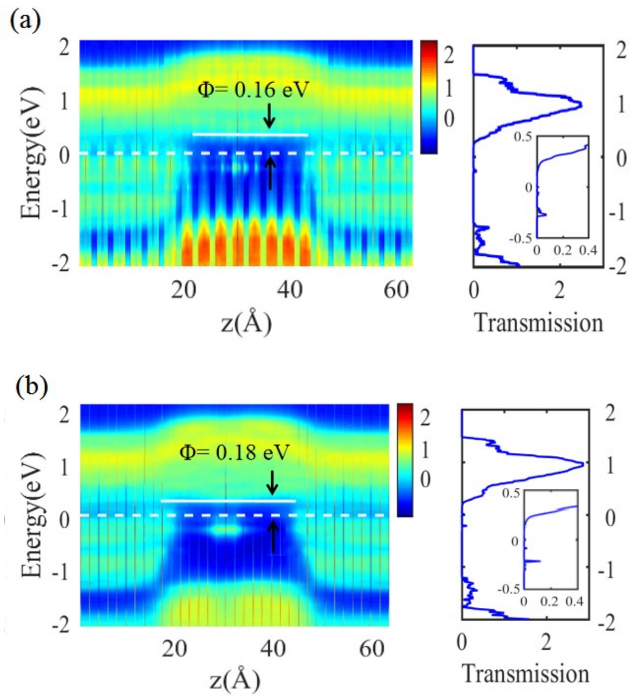

Figure S2 PDOS and transmission coefficient in equilibrium state. (a) f-AC; (b) ZZ. The values of PDOS are represented in various colors on a logarithmic scale. The white dashed lines represent Fermi levels. The barrier height is denoted by Φ. The defect concentration here is lower, specifically half, compared to the reference point in the main text.