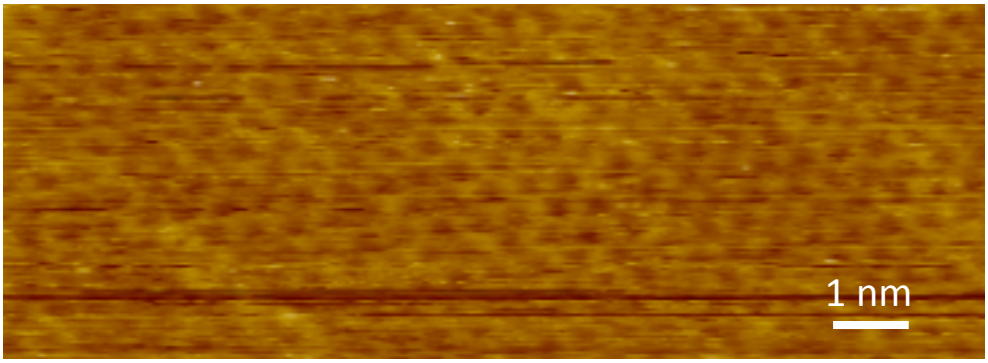
Supplement

a



b

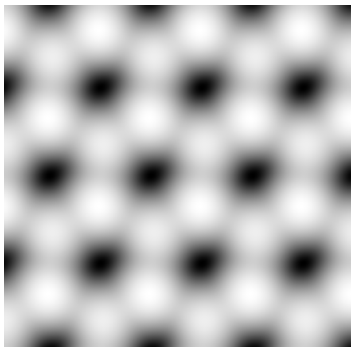


Figure S1. (a) Experimental STM image of stanene prepared on the Ag_2Sn surface alloy at 150 ˚C : U_s = –0.05 V, I = 200 pA and atomic scale simulated STM image at filled state using the structural model as shown in Fig.4 (b).

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Supplement

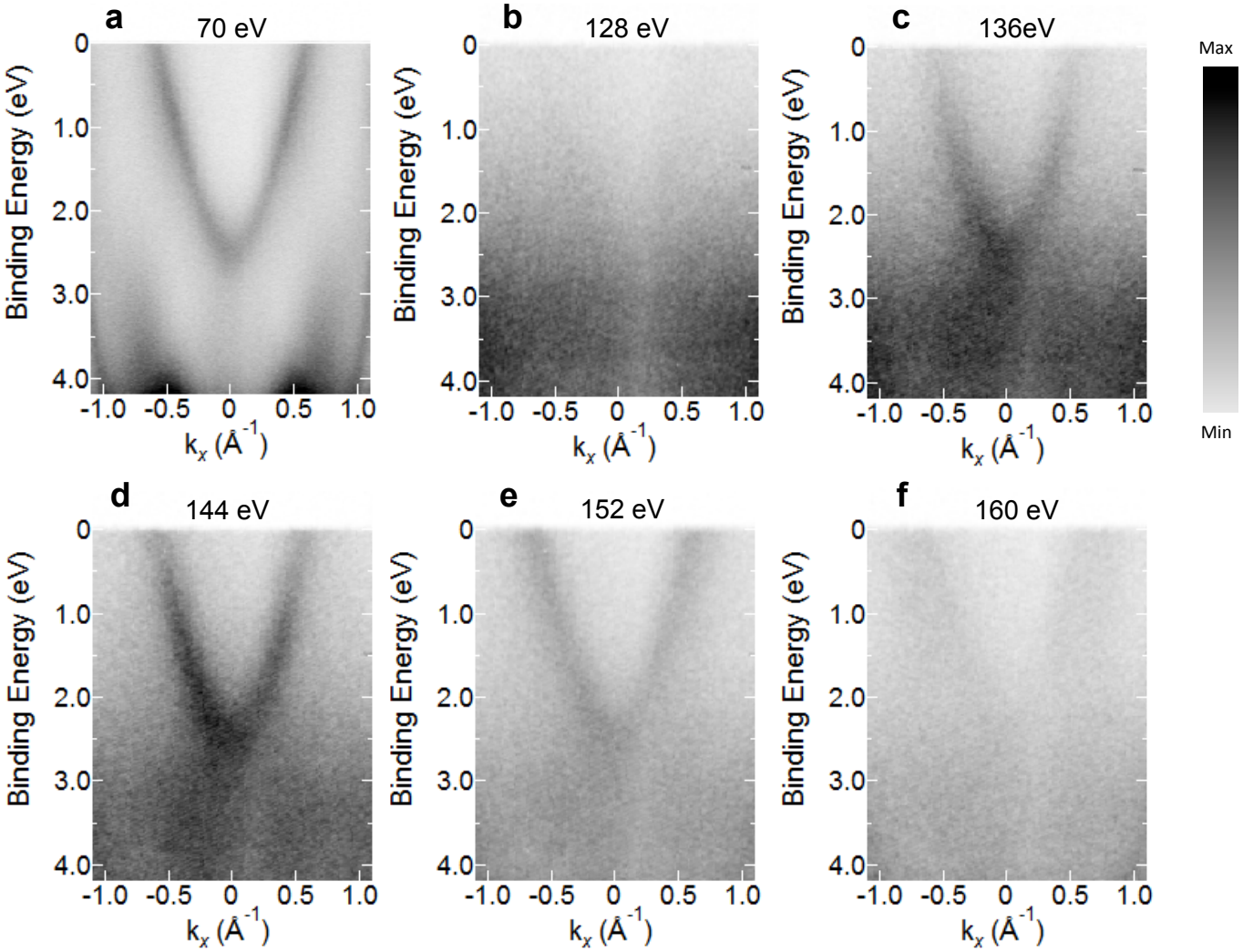

Figure S2. ARPES intensity plots recorded at 10 K of stanene prepared on the Ag_2Sn surface alloy at 150 °C, measured along the K-Γ-K direction, with photon energies of (a) 70 eV, (b) 128 eV, (c) 136 eV, (d) 144 eV, (e) 152 eV, and (f) 160 eV.

The electronic band structure observed exhibits no energy dependence, i.e., no $k_\perp$ dependence, pointing to its pure two-dimensional character, while the intensity is clearly energy dependent for reasons indicated in the main text.

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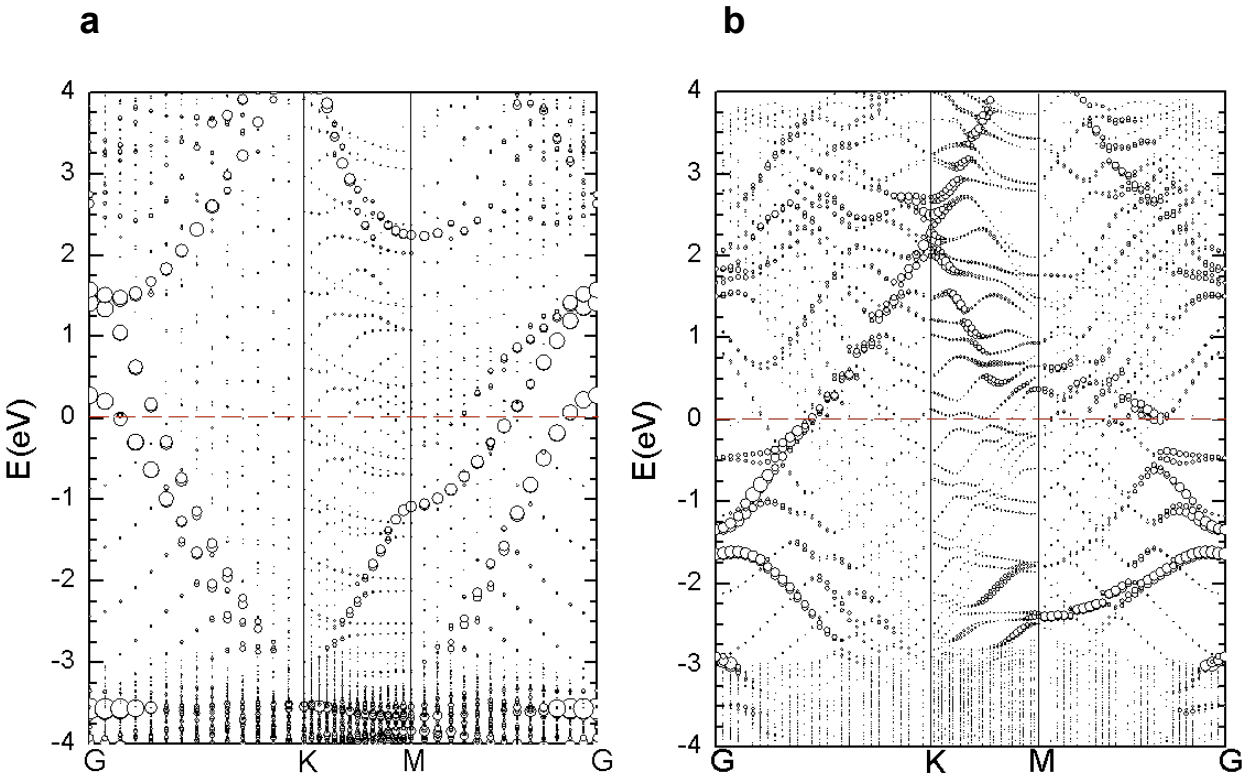

Figure S3. Calculated electronic band structure of the model. (a) Ag_2Sn surface alloy on Ag(111) (b) Stanene on Ag_2Sn surface alloy on Ag(111)

Fig. S3 J. Yuhara et al.

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a

	Peak	Position (eV)	Area ratio (%)	FWHM (eV)
Ag_2Sn surface alloy	A1	23.79	100	0.27
Stanene on Ag_2Sn surface alloy	S1	23.89	65.7	0.23
	A2	24.06	34.3	0.28

b

	Peak	Position (eV)	Area ratio (%)	FWHM (eV)
Ag(111) clean	B	368.13	66.9	0.32
	S_{Ag}	367.94	33.1	0.33
Ag_2Sn surface alloy	B	368.13	47.7	0.32
	I2	368.29	30.6	0.26
	A1	368.40	21.7	0.27
Stanene on Ag_2Sn surface alloy	B	368.13	19.1	0.32
	I3	368.35	47.2	0.29
	A2	368.52	33.7	0.28

Table S1 Detailed decomposition values for each component for (a) the Sn $4d_{5/2}$ and (b) the Ag $3d_{5/2}$ core-level spectra

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