Supporting Information

Robust ferromagnetism in zigzag-edges rich MoS_2 pyramids

Qingwei Zhou,[ab] Shaoqiang Su,[b] Pengfei Cheng,[b] Xianbao Hu,[b] Min Zeng,[b] Xingsen Gao,[b] Zhang Zhang,*[b] Jun-Ming Liu[ab]

[a]*Laboratory of Solid State Microstructures and Innovative Center of Advanced Microstructures, Nanjing University, Nanjing, 210093, China*

[b] *Institute for Advanced Materials and Laboratory of Quantum Engineering and Quantum Materials, South China Academy of Advanced Optoelectronic, Guangzhou 510006, China*

***Corresponding Author**

Zhang Zhang, Email: zzhang@scnu.edu.cn

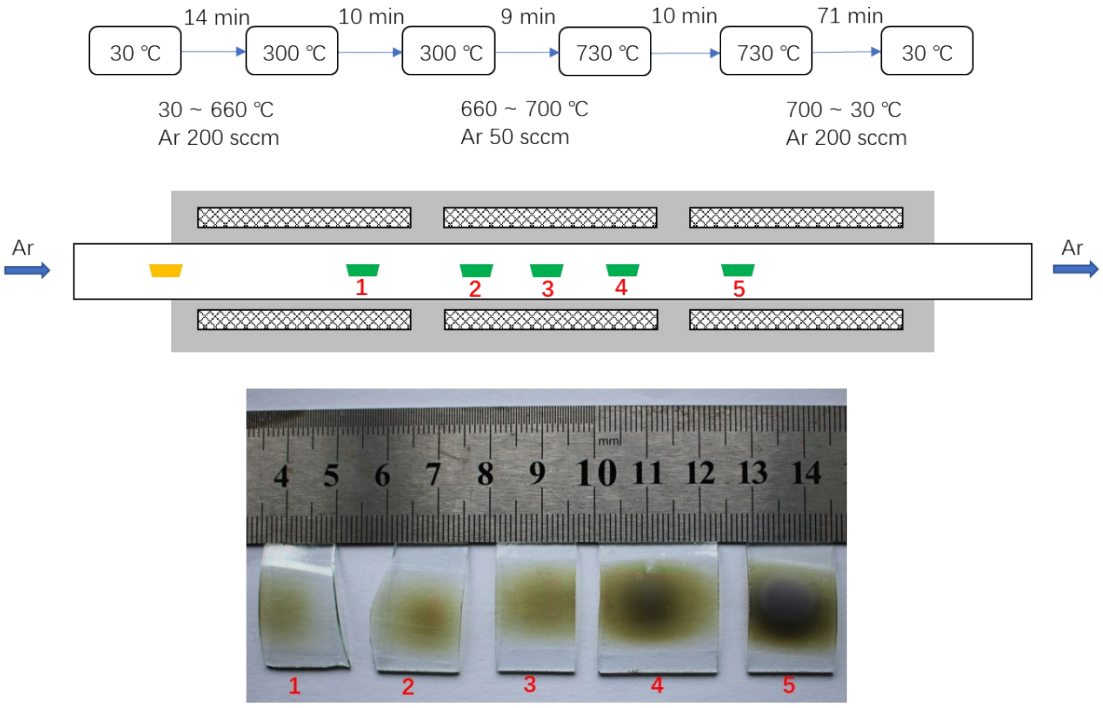

Figure S1. Schematic CVD growth parameters and source distance adjustment for MoS_2 pyramids growth on silica substrates.

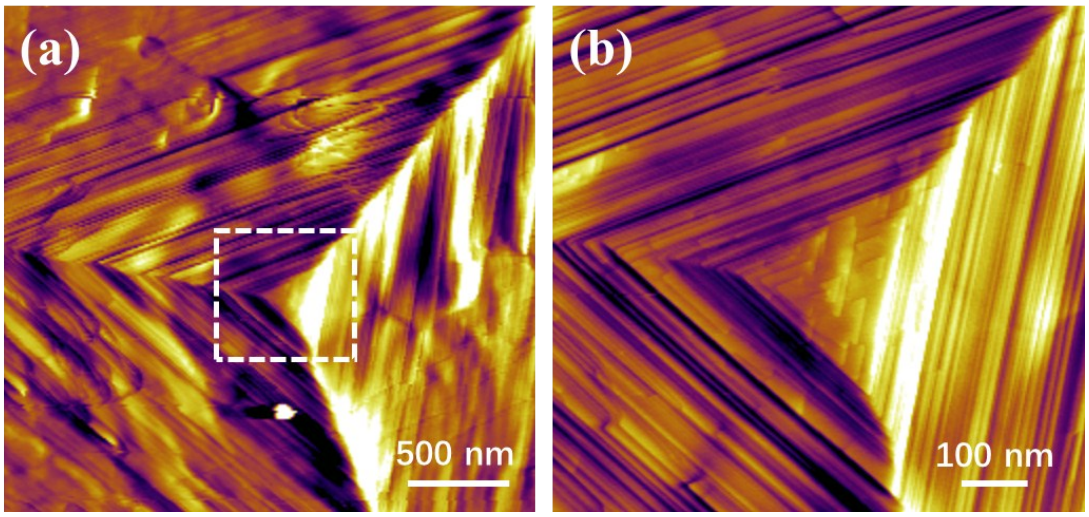

Figure S2. (a) AFM phase image of a single MoS_2 pyramid, and (b) enlarged AFM phase image of the dashed rectangle indicated in (a).

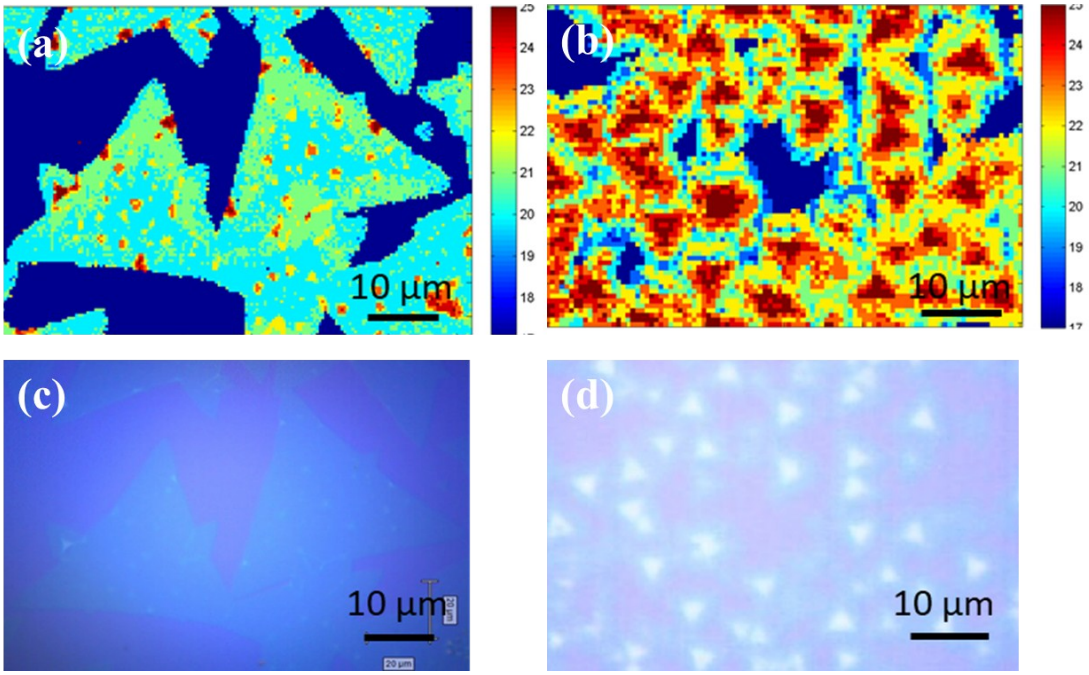

Figure S3. Raman mapping images and the corresponding optic images of MoS_2 flakes (a, c) and MoS_2 Pyramids (b, d).

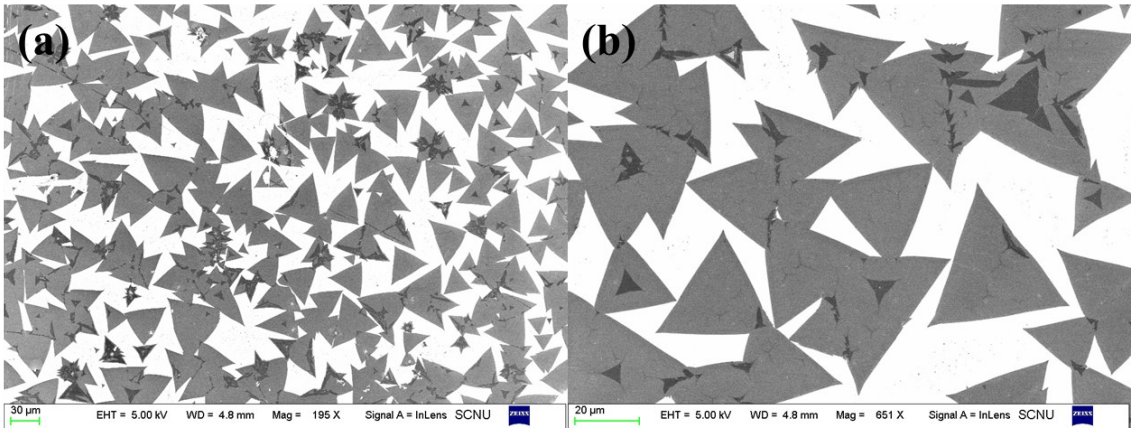

Figure S4. Top-view SEM images of the single layer MoS_2 flakes.

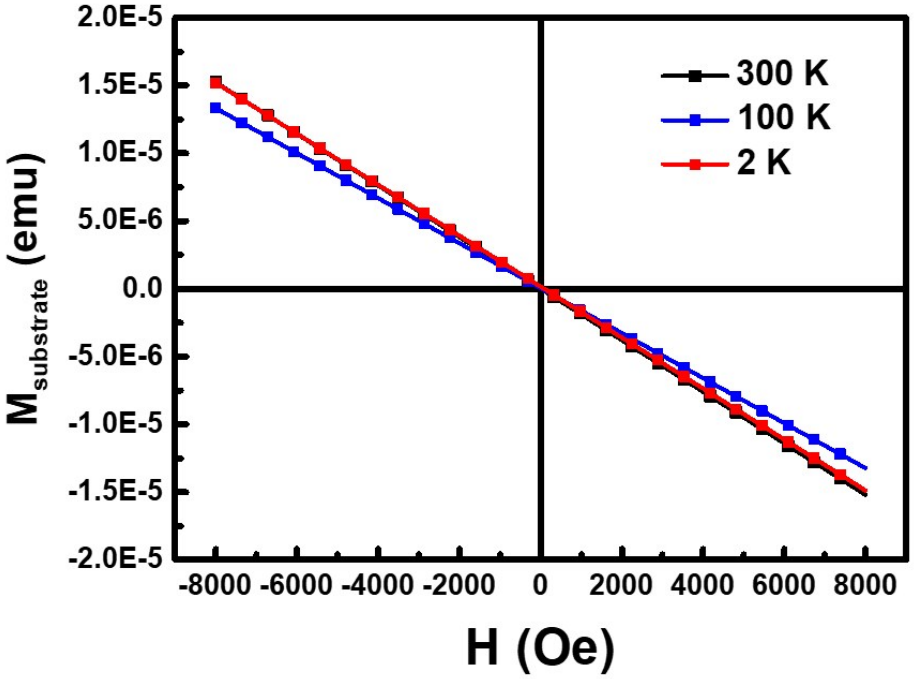

Figure S5. The M-H curves at various temperatures of 300 K (black), 100 K (blue) and 2 K (red) for SiO_2/Si substrate.

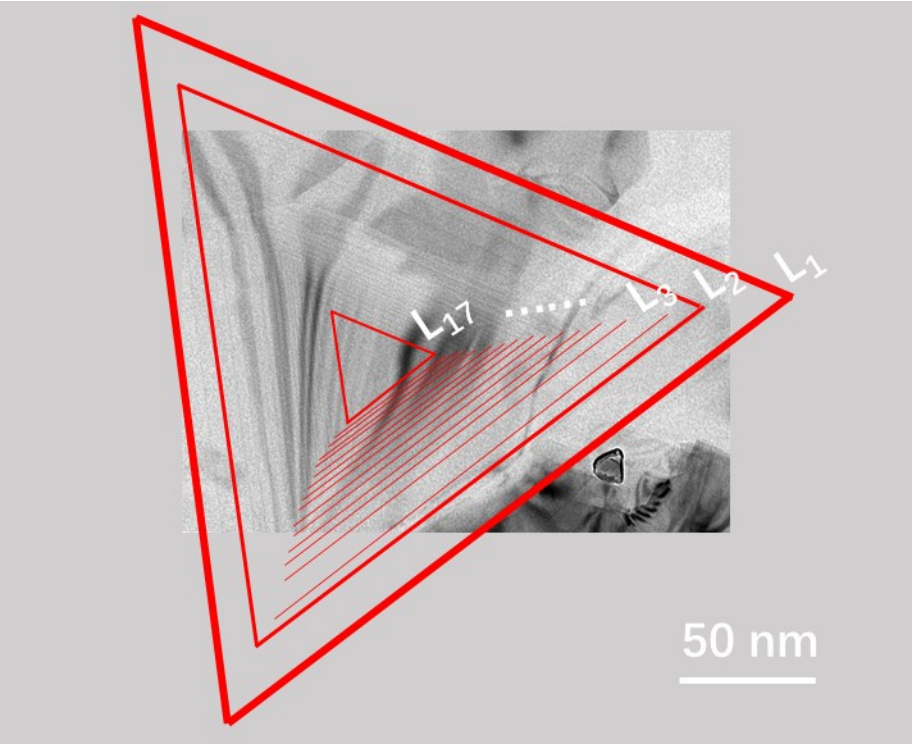

Figure S6. TEM image of a single MoS_2 pyramid with red lines indicating its zigzag-edges of each layer.

We count the zigzag-edge length of each layer (L_1, L_2, L_3 ...L_{17}) and calculate the total zigzag-edge length (L_{total}), the total mass of the pyramid (M_{total}) and the total magnetic mass per unit (M_s).

$L_1 = 259.3\ nm$
$L_2 = 206.8\ nm$
$L_3 = 182.6\ nm$
$L_4 = 157.1\ nm$
$L_5 = 146.2\ nm$
$L_6 = 134.0\ nm$
$L_7 = 123.9\ nm$
$L_8 = 115.6\ nm$
$L_9 = 107.0\ nm$
$L_{10} = 98.2\ nm$
$L_{11} = 89.4\ nm$
$L_{12} = 80.7\ nm$
$L_{13} = 72.6\ nm$
$L_{14} = 66.7\ nm$
$L_{15} = 58.8\ nm$
$L_{16} = 50.6\ nm$
$L_{17} = 41.7\ nm$

$$L_{total} = 3 * (L_1 + L_2 + L_3 + \ldots + L_{17}) = 5973.7\ nm$$

$$M_{total} = \frac{1}{2} * \frac{\sqrt{3}}{2}\left({L_1}^2 + {L_2}^2 + {L_3}^2 + \ldots + {L_{17}}^2\right) * 0.65\ nm * 4.8 * 10^{-21} g/nm^3 = 3.91 * 10^{-16}\ g$$

$$M_s = \frac{L_{total}\ *\ 3.25\ atom/nm\ *\ 2\ \mu_B/atom\ *\ 9.274\ *\ 10^{-21}\ emu/\mu_B}{M_{total}} = 0.922\ g/emu$$