Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting information

Zigzag edge related ferromagnetism in $MoSe_2$ nano-flakes

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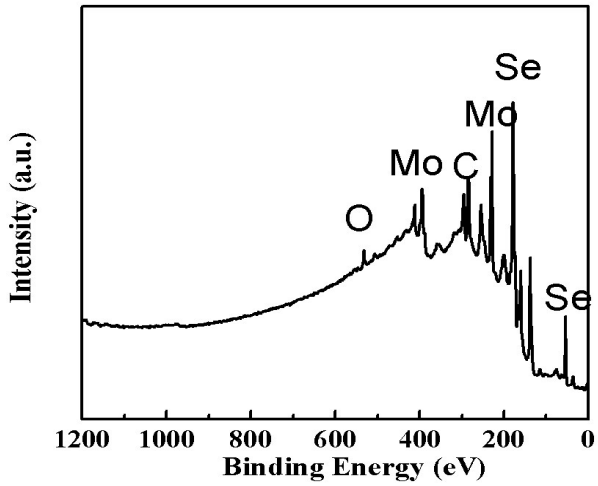

Figure S1: Wide XPS spectrum for sample S860.

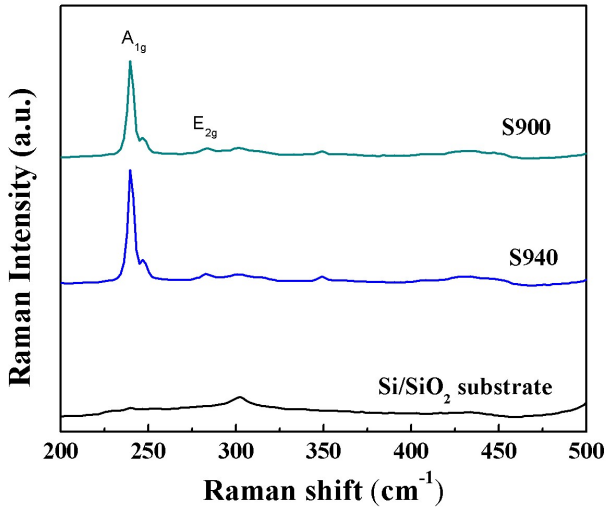

Figure S2: Raman spectrums for sample S900, S940 and the substrate.

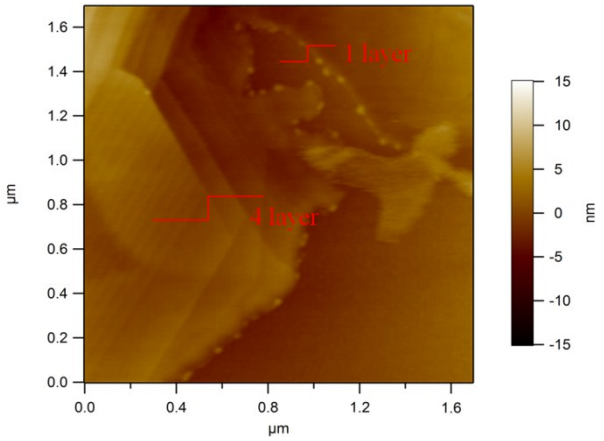

Figure S3: AMF image for sample S900.

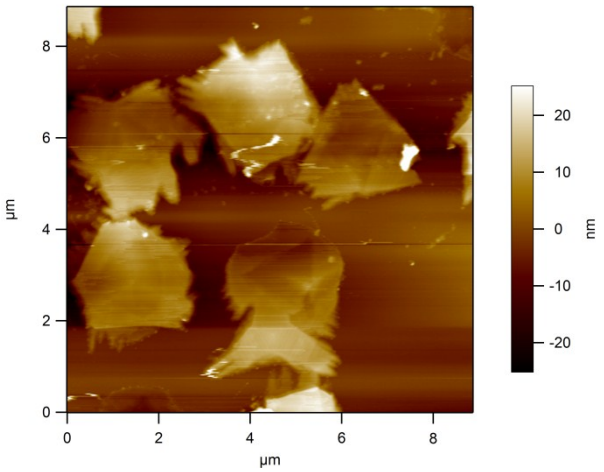

Figure S4: AMF image for sample S940.

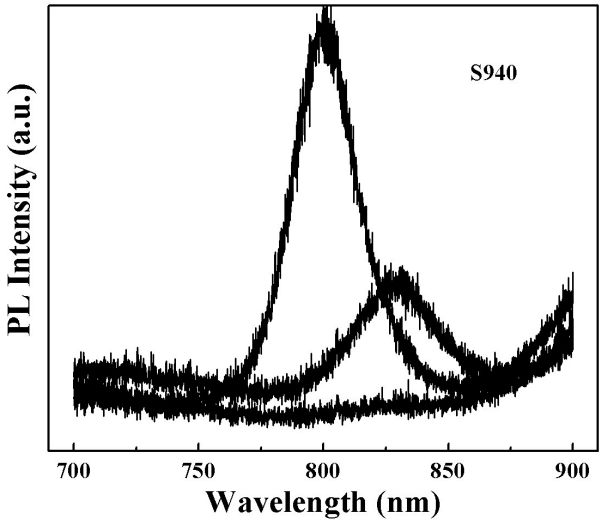

Figure S5: PL results for sample S940 at different selected spots.

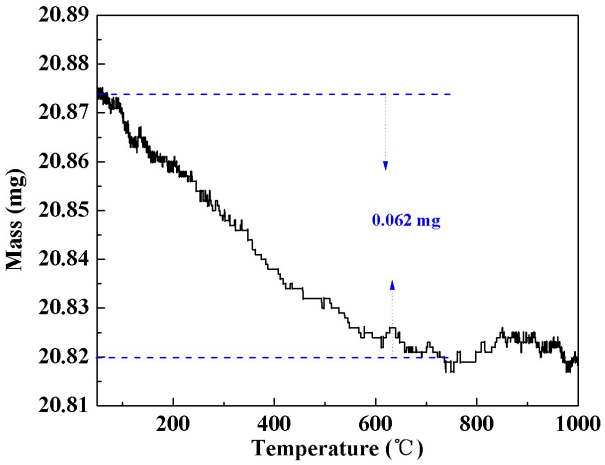

Figure S6: TG result for sample S860.

The size of the sample S860 for the VSM measurement is about 0.5 cm×0.5 cm, while the size of the sample S860 for the TG measurement is 0.25 cm×0.25 cm. So the total mass of the sample is 0.248 mg for the VSM measurement.

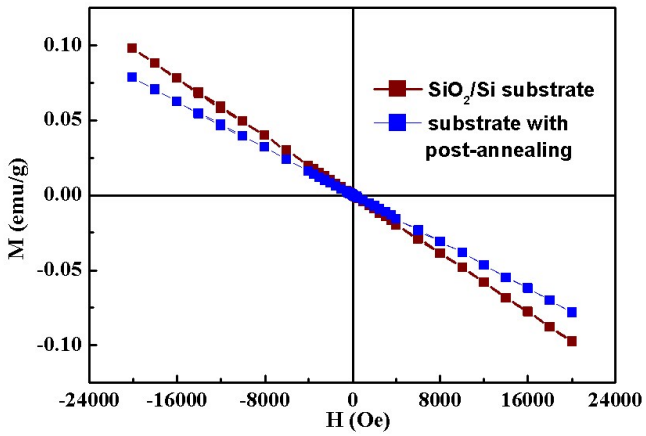

Figure S7: The M-H curves for the substrates.

Recently, it has been revealed that among five different types of vacancy defects such as Mo and S single vacancies, S_2 and MoS double vacancies, and the MoS_2-triple vacancies, only the last one has significant magnetic moments in the supercell [1]. For the case of $MoSe_2$, we also theory studied the $MoSe_2$-triple vacancies related magnetic properties and the results are shown as below.

[1] Y. D. Ma, Y. Dai, M. Guo, C. W. Niu, J. B. Lu and B. B. Huang, Phys. Chem. Chem. Phys., 2011,

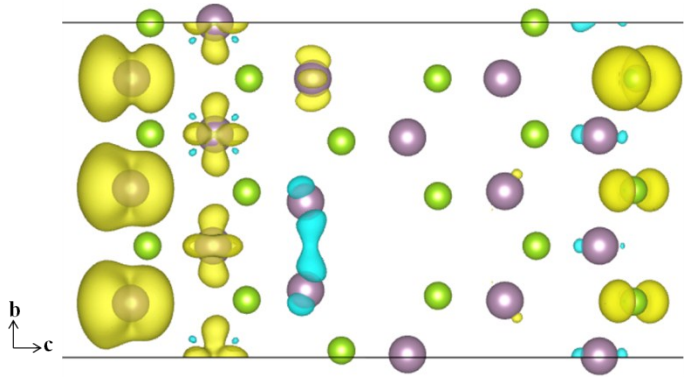

Figure S8: The isosurface plot of the spin density of $MoSe_2$ nanoribbon with one $MoSe_2$-triple vacancies.

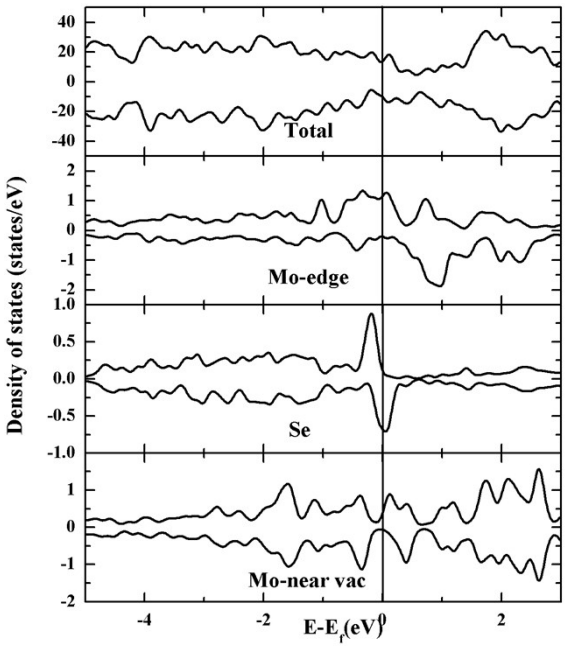

Figure S9. The total DOS and the corresponding PDOS of the edge Mo, Se atoms and the Mo near the $MoSe_2$-triple vacancies for $MoSe_2$ nanoribbon.

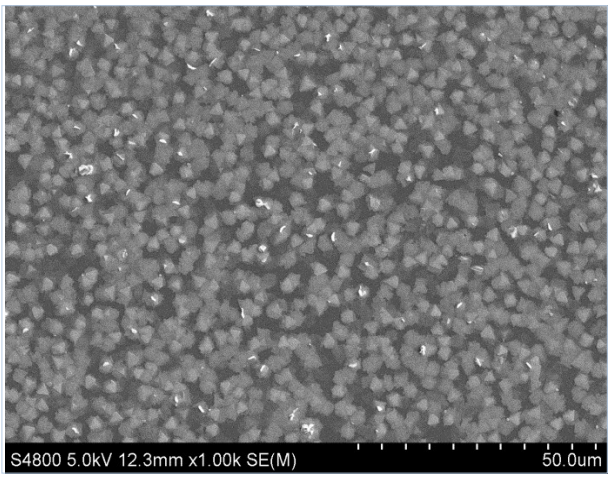

Figure S10. The low magnification time image of sample S940.