Supporting Information for

P-type doping in 2M-WS_2 for a complete phase diagram

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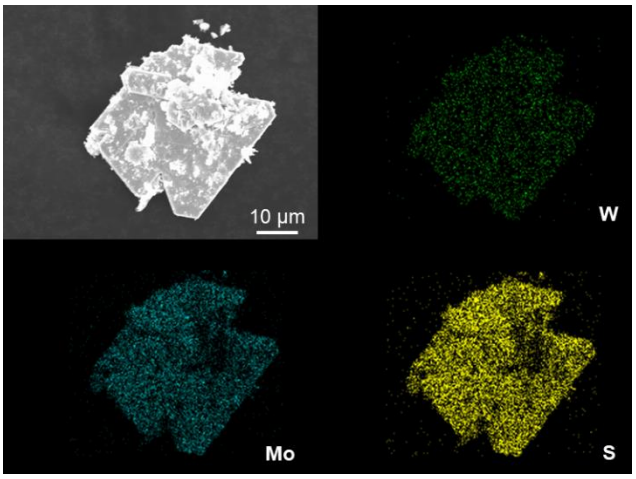

Figure S1. The elemental mapping of $W_{0.9}Mo_{0.1}S_2$.

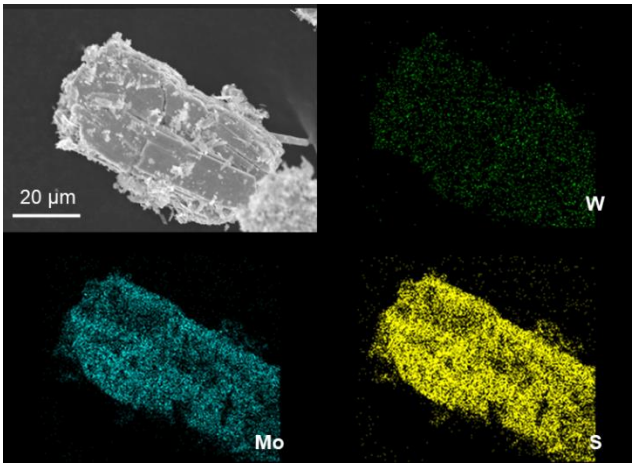

Figure S2. The elemental mapping of $W_{0.8}Mo_{0.2}S_2$.

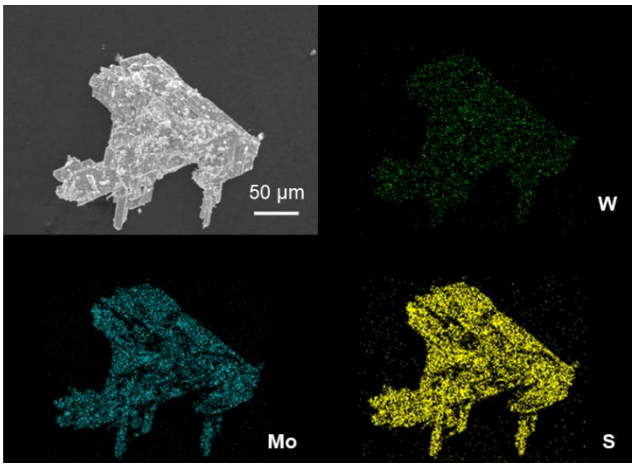

Figure S3. The elemental mapping of $W_{0.7}Mo_{0.3}S_2$.

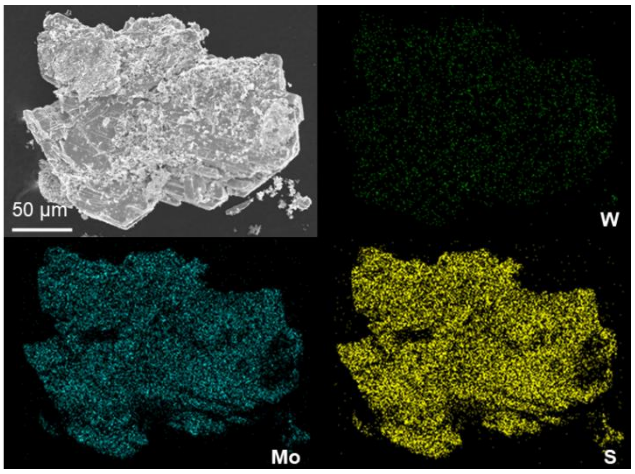

Figure S4. The elemental mapping of $W_{0.6}Mo_{0.4}S_2$.

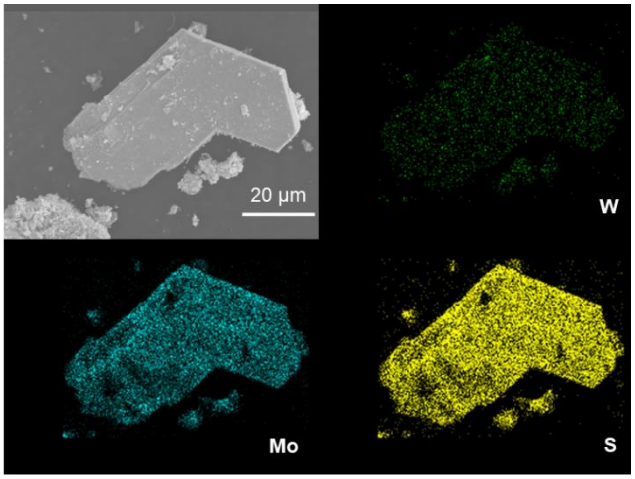

Figure S5. The elemental mapping of $W_{0.5}Mo_{0.5}S_2$.

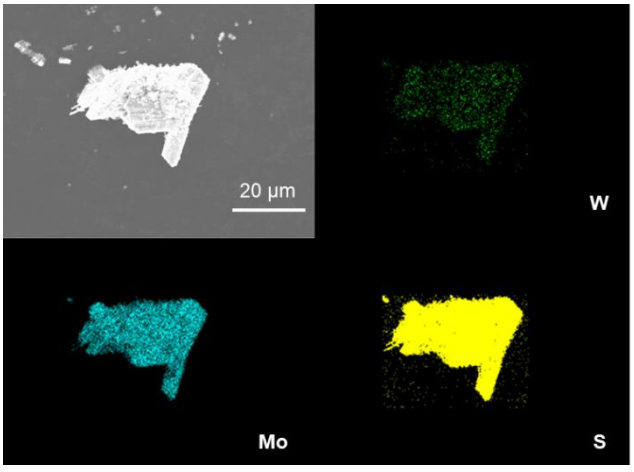

Figure S6. The elemental mapping of $W_{0.4}Mo_{0.6}S_2$.

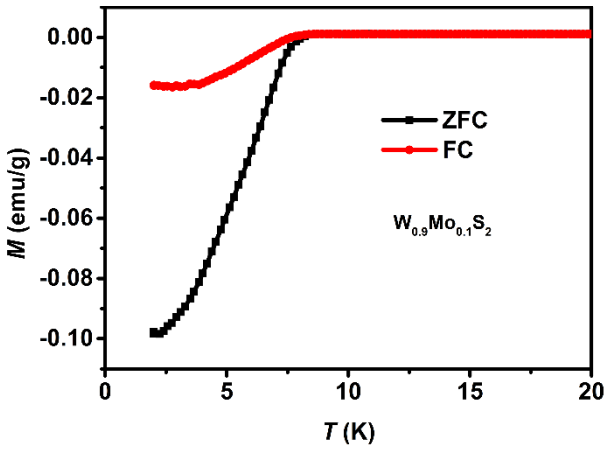

Figure S9. Temperature dependence of magnetic susceptibility for $W_{0.9}Mo_{0.1}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

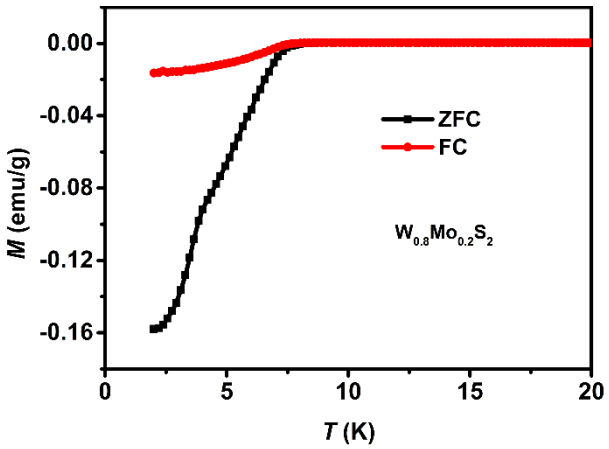

Figure S10. Temperature dependence of magnetic susceptibility for $W_{0.8}Mo_{0.2}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

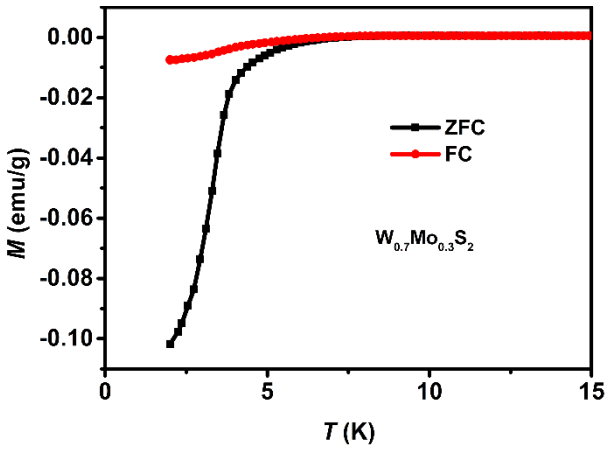

Figure S11. Temperature dependence of magnetic susceptibility for $W_{0.7}Mo_{0.3}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

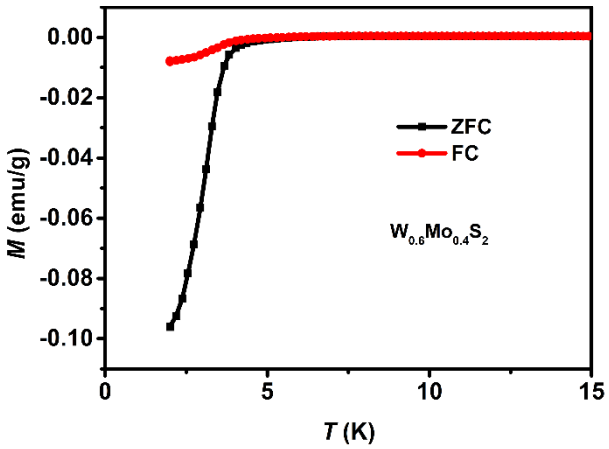

Figure S12. Temperature dependence of magnetic susceptibility for $W_{0.6}Mo_{0.4}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

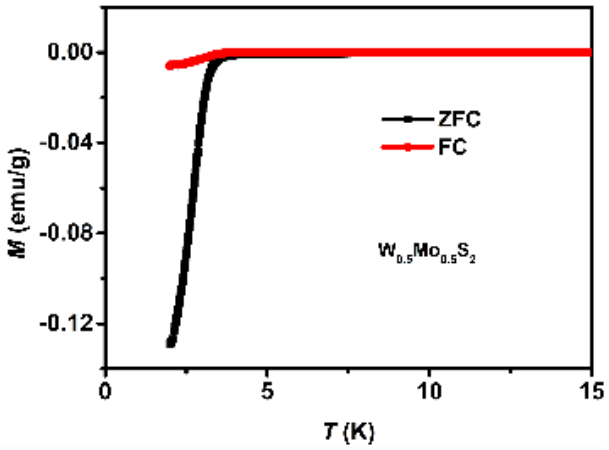

Figure S13. Temperature dependence of magnetic susceptibility for $W_{0.5}Mo_{0.5}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

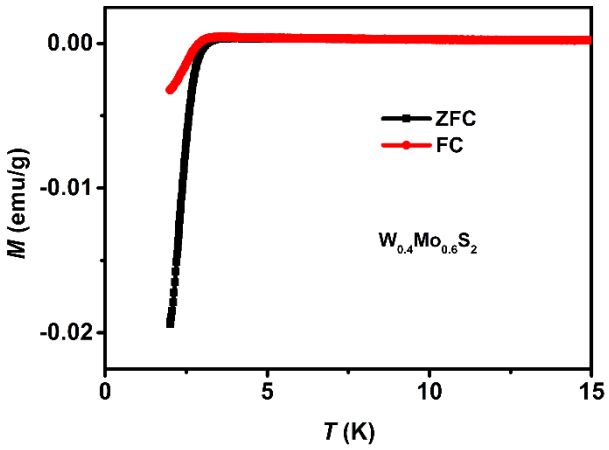

Figure S14. Temperature dependence of magnetic susceptibility for $W_{0.4}Mo_{0.6}S_2$ under the magnetic field of 10 Oe with zero-field-cooling curve (black) and field-cooling curve (red).

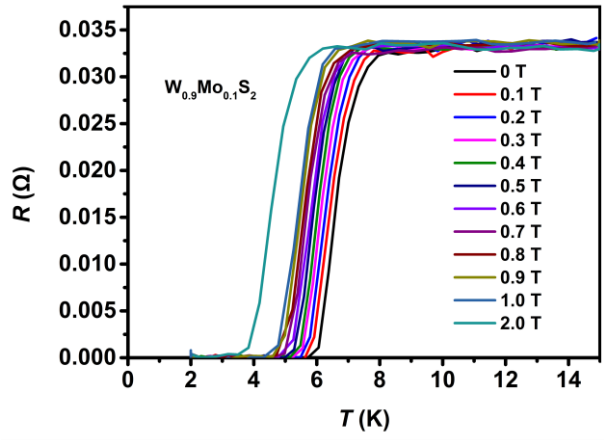

Figure S13. The temperature dependence of the resistances for $W_{0.9}Mo_{0.1}S_2$ under different magnetic fields.

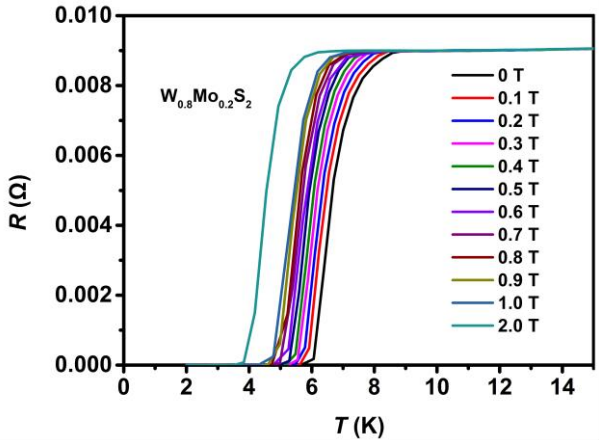

Figure S14. The temperature dependence of the resistances for $W_{0.8}Mo_{0.2}S_2$ under different magnetic fields.

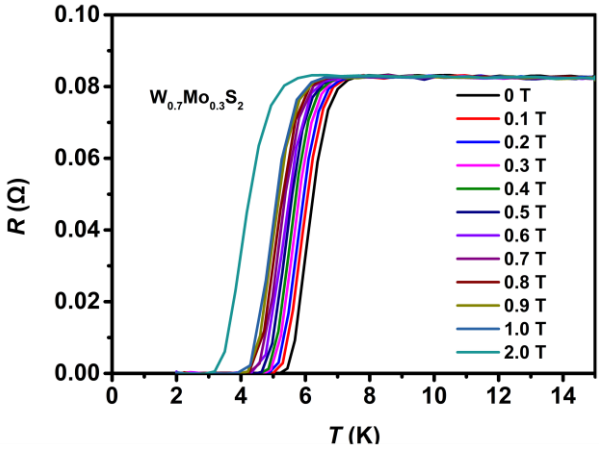

Figure S15. The temperature dependence of the resistances for $W_{0.7}Mo_{0.3}S_2$ under different magnetic fields.

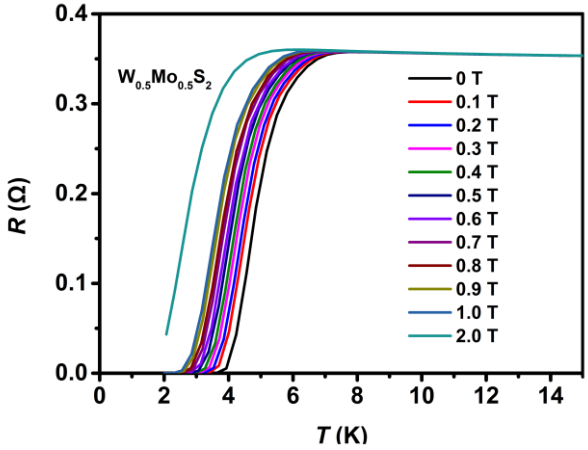

Figure S16. The temperature dependence of the resistances for $W_{0.5}Mo_{0.5}S_2$ under different magnetic fields.

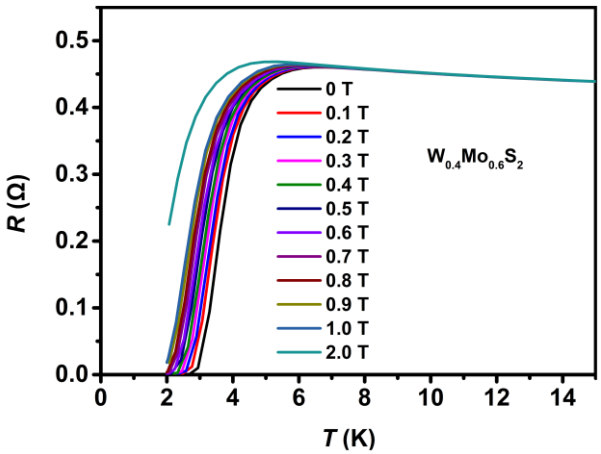

Figure S17. The temperature dependence of the resistances for $W_{0.4}Mo_{0.6}S_2$ under different magnetic fields.

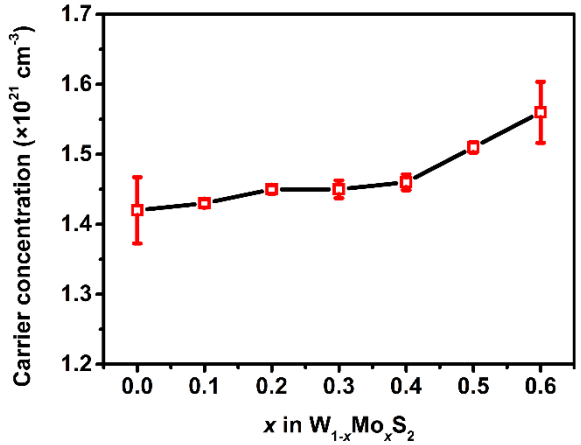

Figure S18. Bulk carrier concentration of $W_{1-x}Mo_xS_2$.

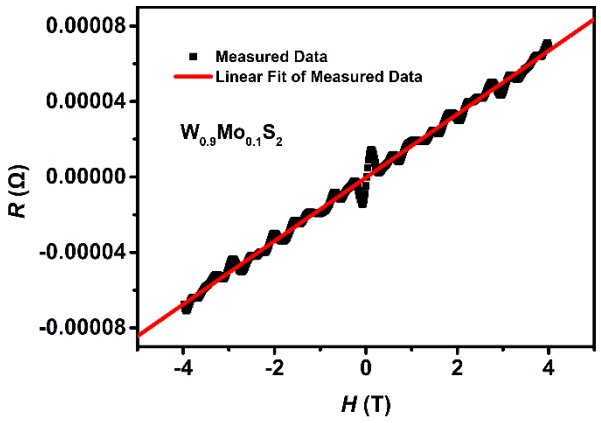

Figure S19. The curve of Hall resistance varies with the magnetic field for $W_{0.9}Mo_{0.1}S_2$.

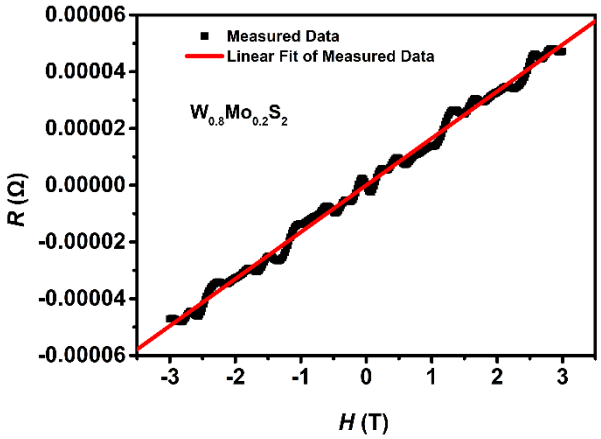

Figure S20. The curve of Hall resistance varies with the magnetic field for $W_{0.8}Mo_{0.2}S_2$.

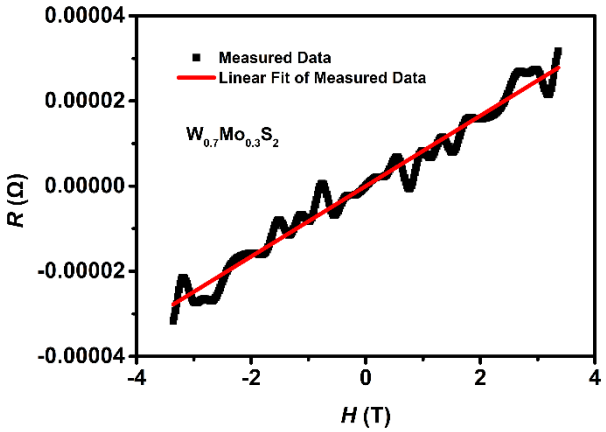

Figure S21. The curve of Hall resistance varies with the magnetic field for $W_{0.7}Mo_{0.3}S_2$.

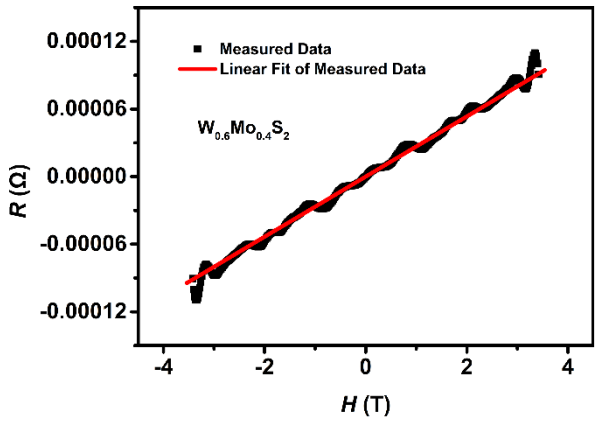

Figure S22. The curve of Hall resistance varies with the magnetic field for $W_{0.6}Mo_{0.4}S_2$.

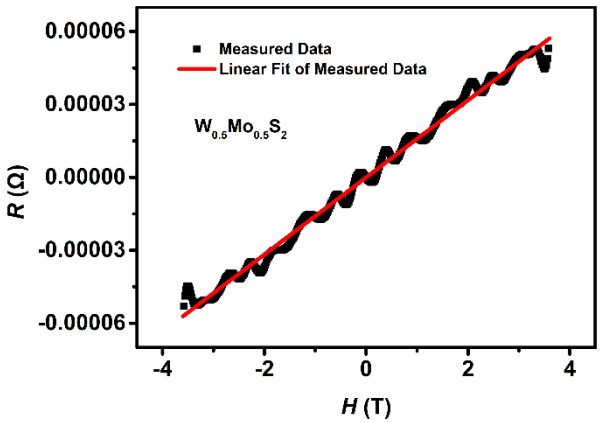

Figure S23. The curve of Hall resistance varies with the magnetic field for $W_{0.5}Mo_{0.5}S_2$.

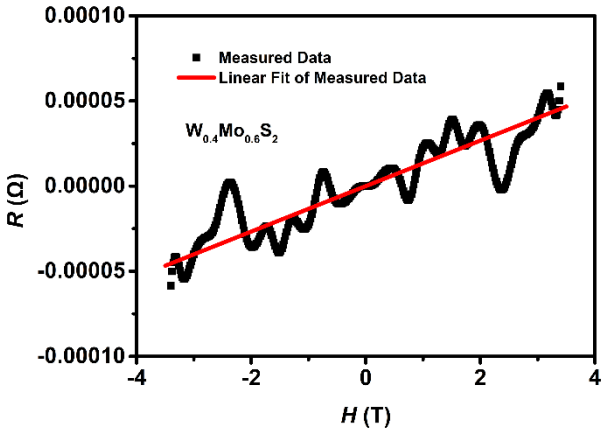

Figure S24. The curve of Hall resistance varies with the magnetic field for $W_{0.4}Mo_{0.6}S_2$.

Table S1 Geometric dimension and R-H curve slope of $W_{1-x}Mo_xS_2$ samples in Hall measurement

***x* in $W_{(1-x)}Mo_xS_2$**	**Slope(*R*/*H*)**	**The standard deviation of Slope**	**Thickness/cm**
1	1.681×10^{-5}	6.568×10^{-8}	2.6×10^{-2}
2	1.653×10^{-5}	7.080×10^{-8}	2.6×10^{-2}
3	8.273×10^{-6}	7.275×10^{-8}	5.2×10^{-2}
4	2.670×10^{-5}	2.100×10^{-7}	1.6×10^{-2}
5	1.588×10^{-5}	8.043×10^{-8}	2.6×10^{-2}
6	1.336×10^{-5}	3.861×10^{-7}	3.0×10^{-2}

x in $W_{(1-x)}Mo_xS_2$	n(cm^{-3})	The standard deviation of n
1	1.43×10^{21}	5.90×10^{18}
2	1.45×10^{21}	6.20×10^{18}
3	1.45×10^{21}	1.27×10^{19}
4	1.46×10^{21}	1.14×10^{19}
5	1.51×10^{21}	7.60×10^{18}
6	1.56×10^{21}	4.37×10^{19}