

## Supplementary Information

### Facile synthesis of vacancy-induced 2H-MoS<sub>2</sub> nanosheet and defect investigation for supercapacitor application

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Supplementary information is attached in this section to provide additional evidence for the findings. These include an Comparable CV results of MoS<sub>2</sub>, MoS<sub>2-x</sub>-300, MoS<sub>2-x</sub>-500 and MoS<sub>2-x</sub>-700 (Fig. S1) and total density of states(DOS) of pristine MoS<sub>2</sub>, MoS<sub>2-x</sub> with B-V, MoS<sub>2-x</sub> with Mo-V and (b)MoS<sub>2-x</sub> with S-V (Fig. S2), Comparable XPS spectra of S 2p in MoS<sub>2</sub>, MoS<sub>2-x</sub>-300, MoS<sub>2-x</sub>-500 and MoS<sub>2-x</sub>-700 with quantitative atomic analysis (Fig. S3) and load mass of active material in MoS<sub>2</sub> and MoS<sub>2-x</sub> electrodes (Table S1).

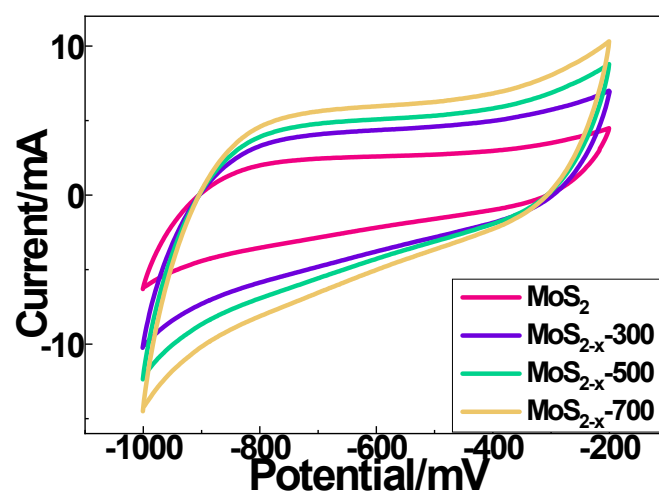


Figure S1 Comparable CV results of MoS<sub>2</sub>, MoS<sub>2-x</sub>-300, MoS<sub>2-x</sub>-500 and MoS<sub>2-x</sub>-700

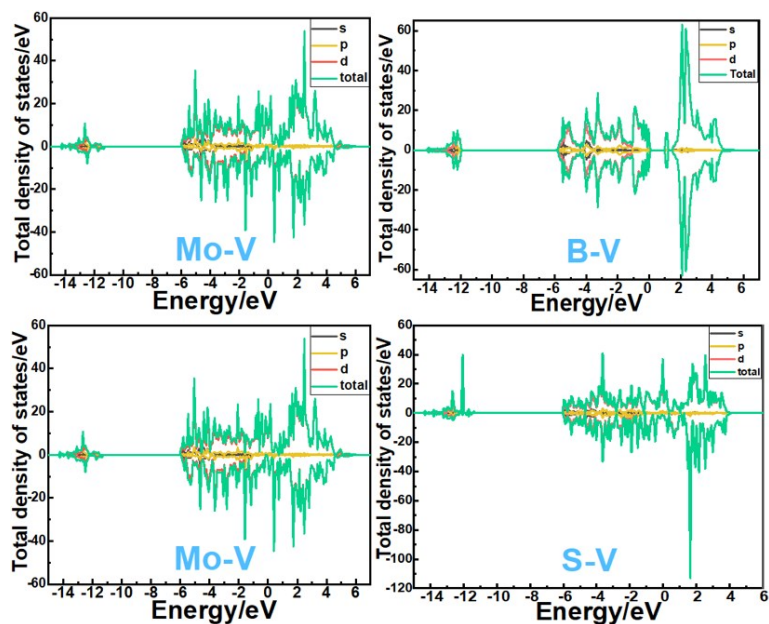


Figure S2 Total density of states (DOS) of pristine  $\text{MoS}_2$ ,  $\text{MoS}_{2-x}$  with B-V,  $\text{MoS}_{2-x}$  with Mo-V and  $\text{MoS}_{2-x}$  with S-V

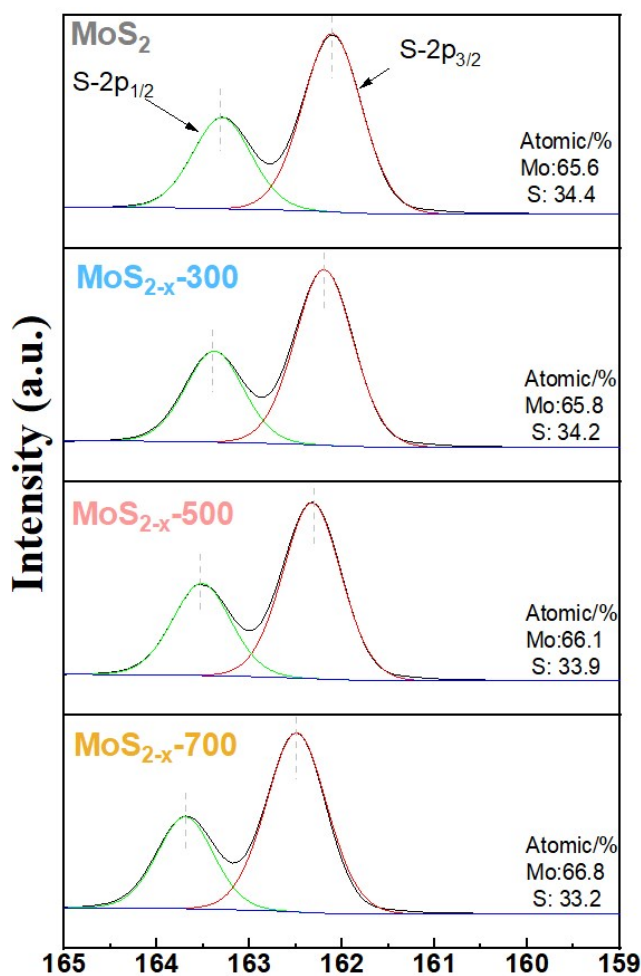


Figure S3 Comparable XPS spectra of S 2p in  $\text{MoS}_2$ ,  $\text{MoS}_{2-x}$ -300,  $\text{MoS}_{2-x}$ -500 and  $\text{MoS}_{2-x}$ -700 and quantitative atomic analysis within the samples

**Table S1 Load mass of active material and specific capacitance measured by mass ratio**

Electrode	Load mass (mg)	Capacitance (F)	Current density (A g <sup>-1</sup> )	Specific Capacitance (F g <sup>-1</sup> )
MoS <sub>2</sub>	32.1	3.13	1.0	97.5
MoS <sub>2-x</sub> -300	28.5	3.41	1.0	119.7
MoS <sub>2-x</sub> -500	45.4	5.97	1.0	131.6
MoS <sub>2-x</sub> -700	33.7	4.81	1.0	142.7