

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Structural evolution of the AIRSS-found $\text{Li}_{1.625}\text{MoS}_2$ phase while being gradually delithiated.

File Name: Supplementary Movie 2

Description: Structural evolution of the AIRSS-found Li_2MoS_2 phase while being gradually delithiated.

File Name: Supplementary Movie 3

Description: Structural evolution of the AIRSS-found Li_2ReS_2 phase while being gradually delithiated.

File Name: Supplementary Movie 4

Description: Structural evolution of the AIRSS-found $\text{Li}_{2.5}\text{ReS}_2$ phase while being gradually delithiated.