

Electronic supplementary information :

Room temperature X-ray diffraction patterns of 19 as-prepared pure samples, after final firing at temperatures reported in table 1, and cooling down to room temperature at 5°C/min.

* : main superstructure peaks

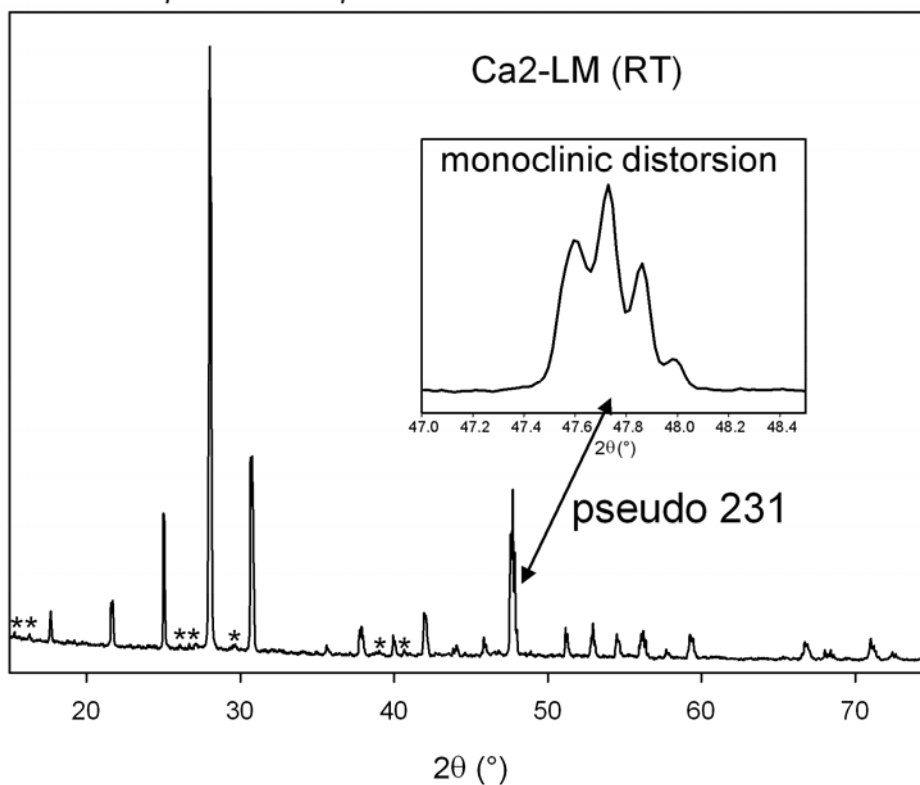


Figure S1: Room temperature XRD pattern of $\text{La}_{1.96}\text{Ca}_{0.04}\text{Mo}_2\text{O}_{8.98}$ (Ca2-LM), showing the monoclinic distortion and main superstructure peaks of the α LAMOX form.

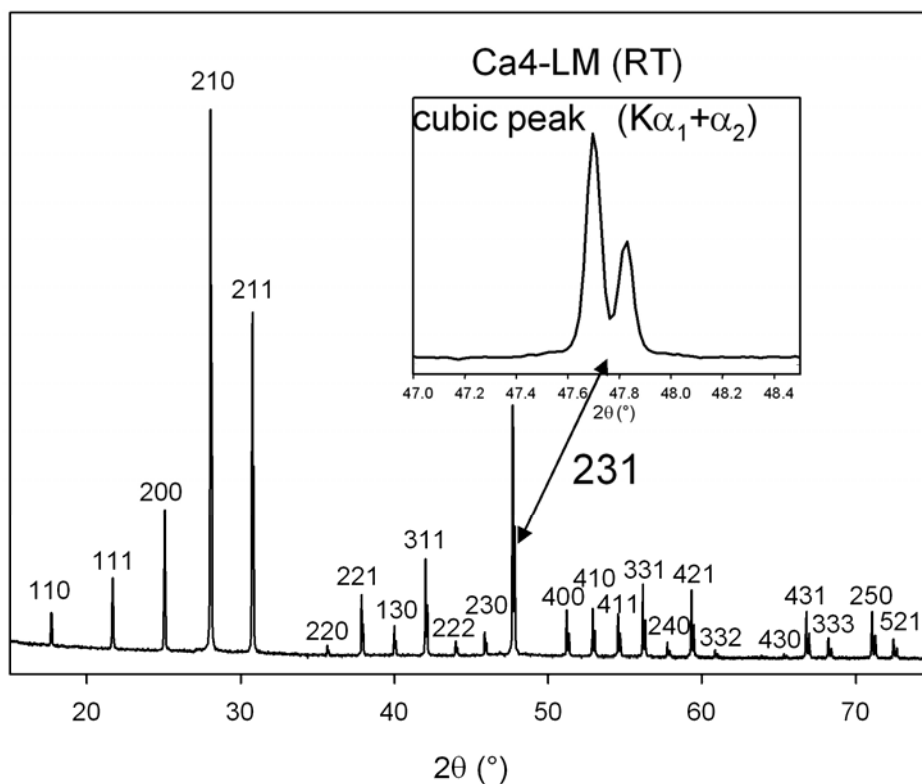


Figure S2 : Room temperature XRD pattern of $\text{La}_{1.92}\text{Ca}_{0.08}\text{Mo}_2\text{O}_{8.96}$ (Ca4-LM), showing the absence of monoclinic distortion and the peak indexation of the cubic β LAMOX form.

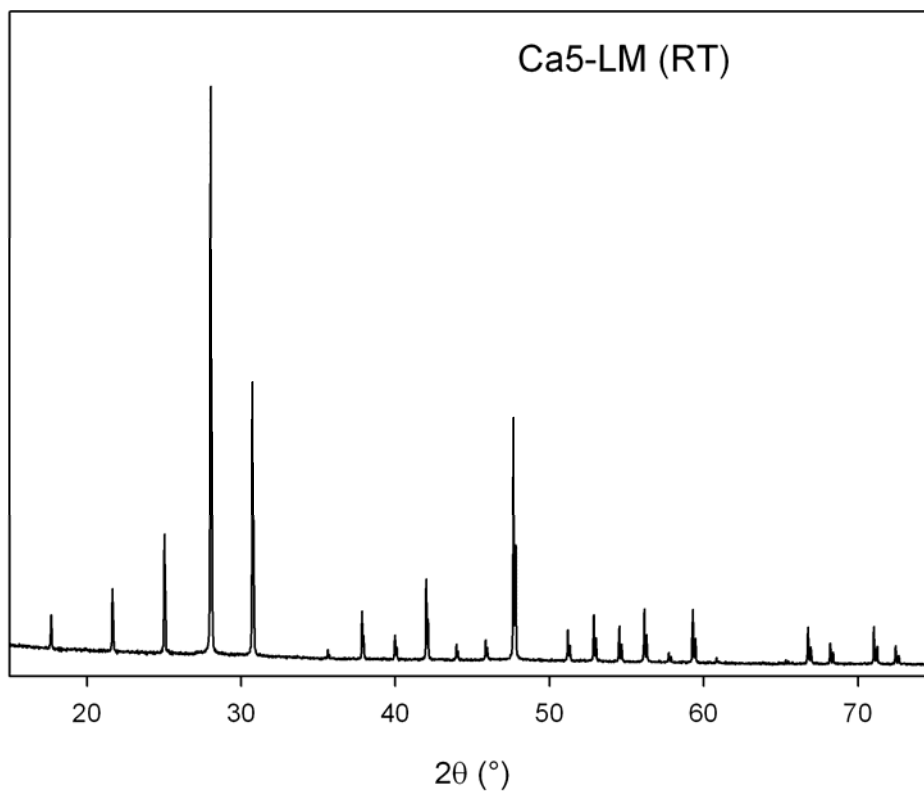


Figure S3 : Room temperature XRD pattern of La_{1.9}Ca_{0.1}Mo₂O_{8.95} (Ca5-LM).

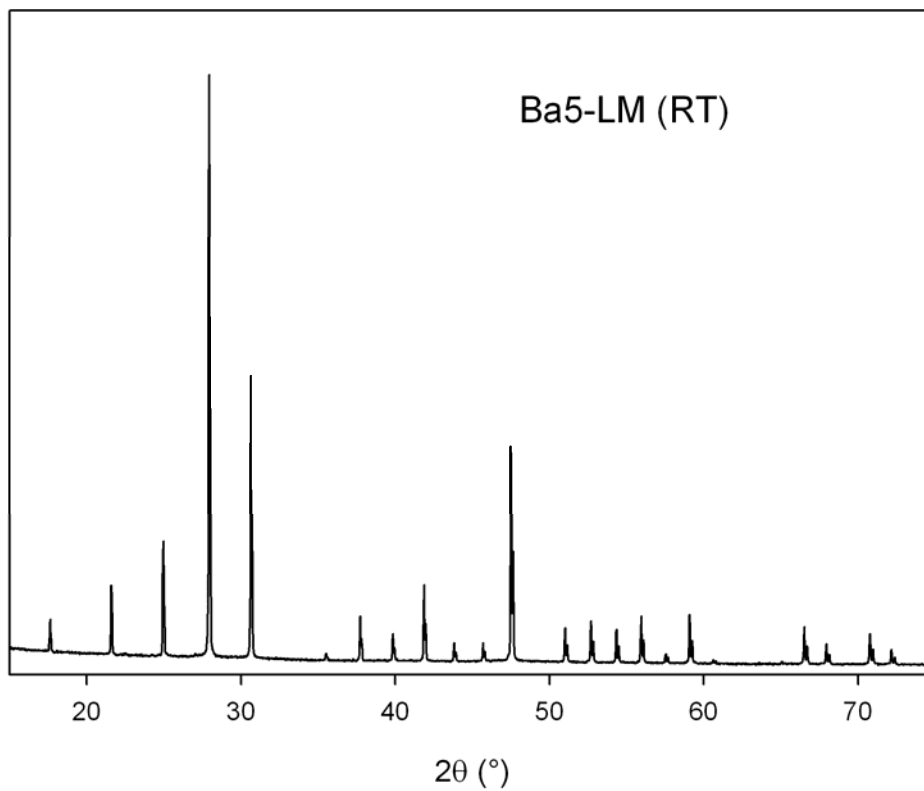


Figure S4 : Room temperature XRD pattern of La_{1.9}Ba_{0.1}Mo₂O_{8.95} (Ba5-LM).

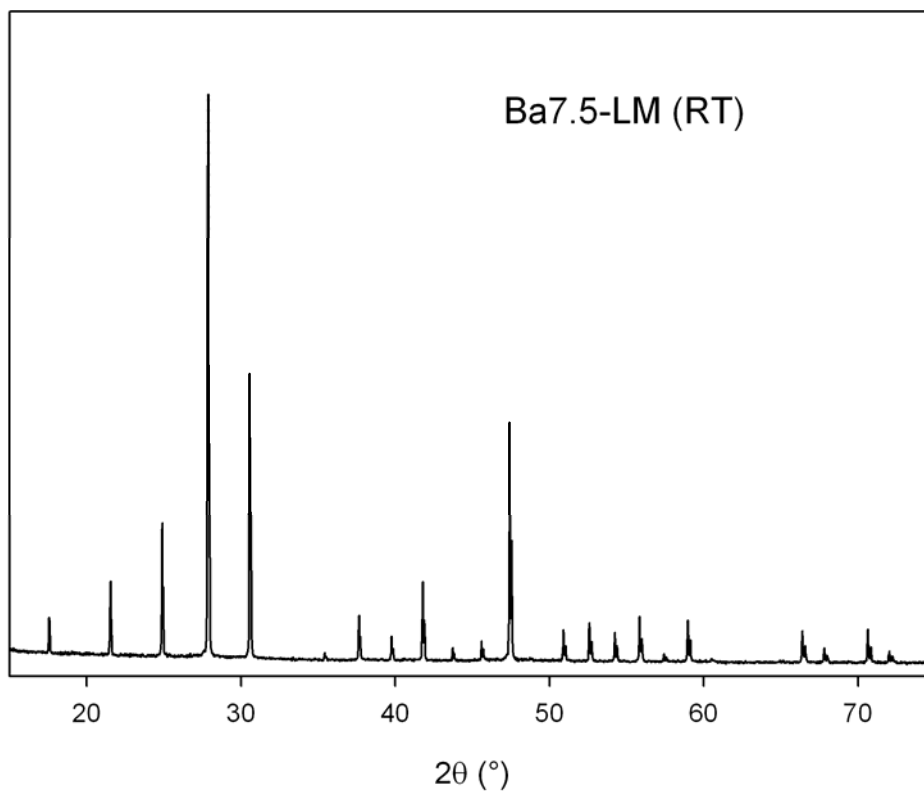


Figure S5 : Room temperature XRD pattern of $\text{La}_{1.85}\text{Ba}_{0.15}\text{Mo}_2\text{O}_{8.925}$ (Ba7.5-LM).

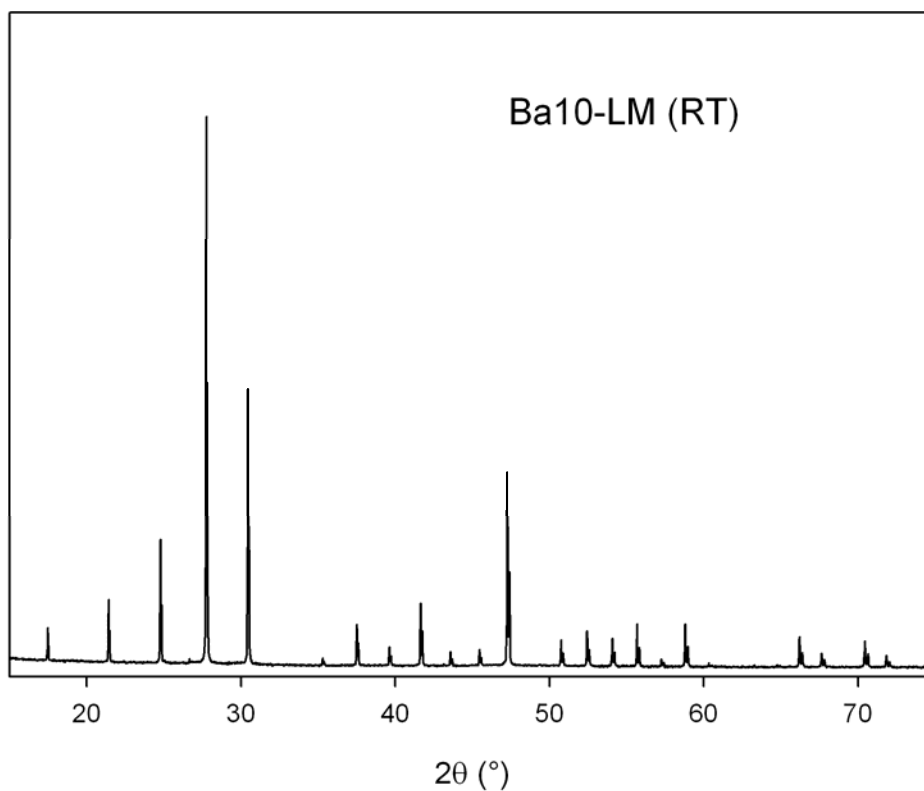


Figure S6 : Room temperature XRD pattern of $\text{La}_{1.8}\text{Ba}_{0.2}\text{Mo}_2\text{O}_{8.9}$ (Ba10-LM).

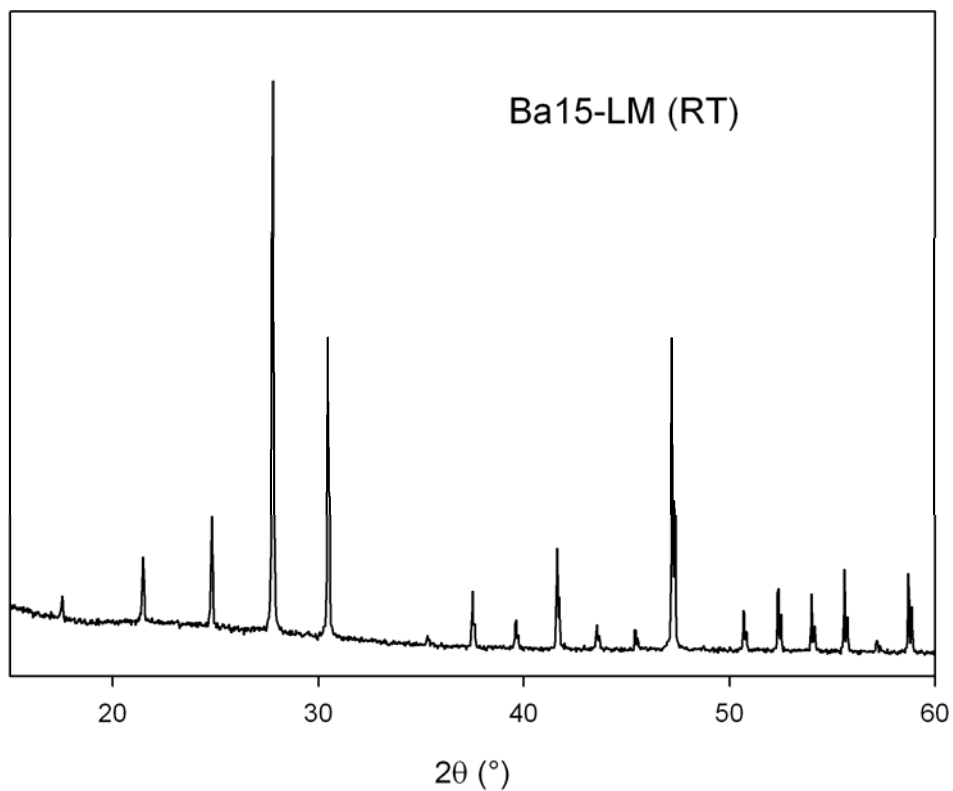


Figure S7 : Room temperature XRD pattern of $\text{La}_{1.7}\text{Ba}_{0.3}\text{Mo}_2\text{O}_{8.85}$ (Ba15-LM).

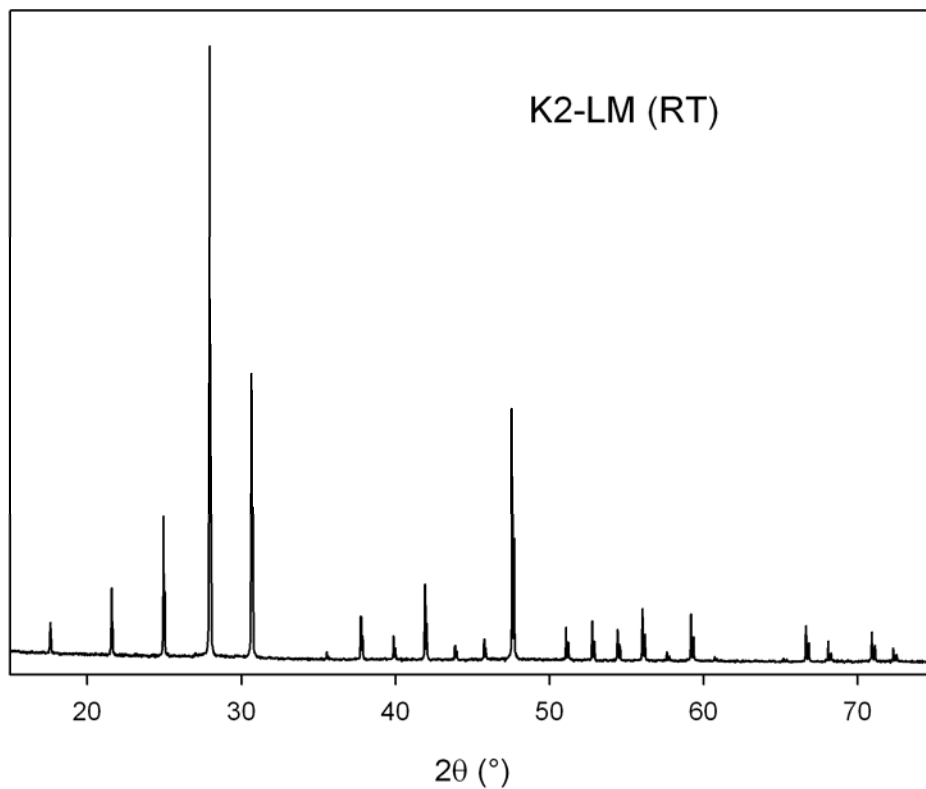


Figure S8 : Room temperature XRD pattern of $\text{La}_{1.96}\text{K}_{0.04}\text{Mo}_2\text{O}_{8.96}$ (K2-LM).

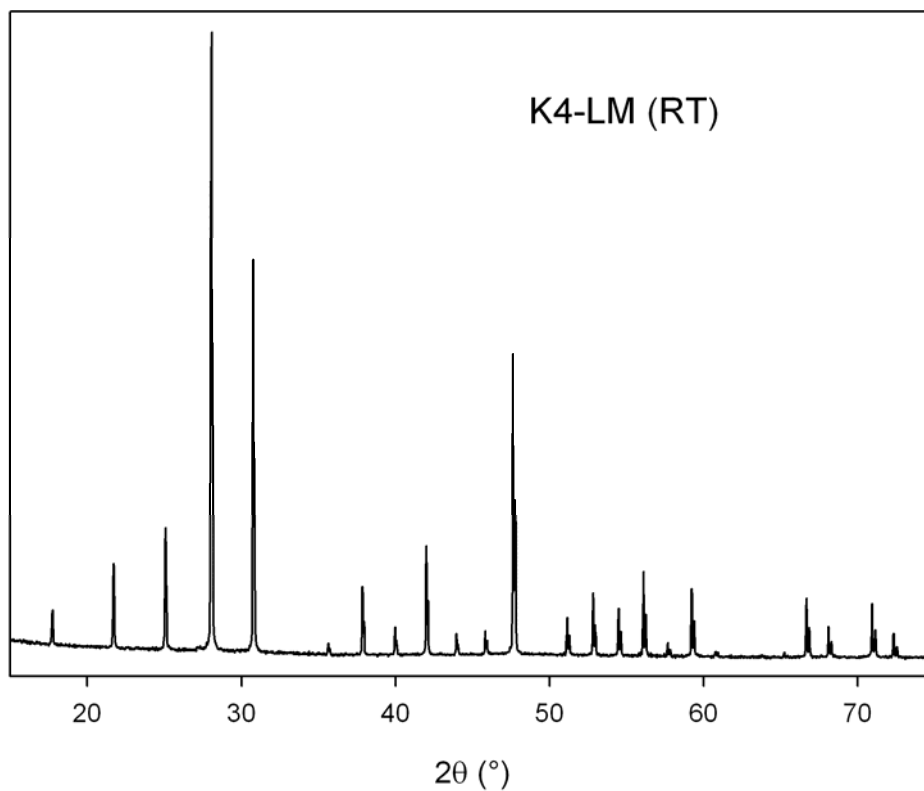


Figure S9 : Room temperature XRD pattern of $\text{La}_{1.92}\text{K}_{0.08}\text{Mo}_2\text{O}_{8.92}$ (K4-LM).

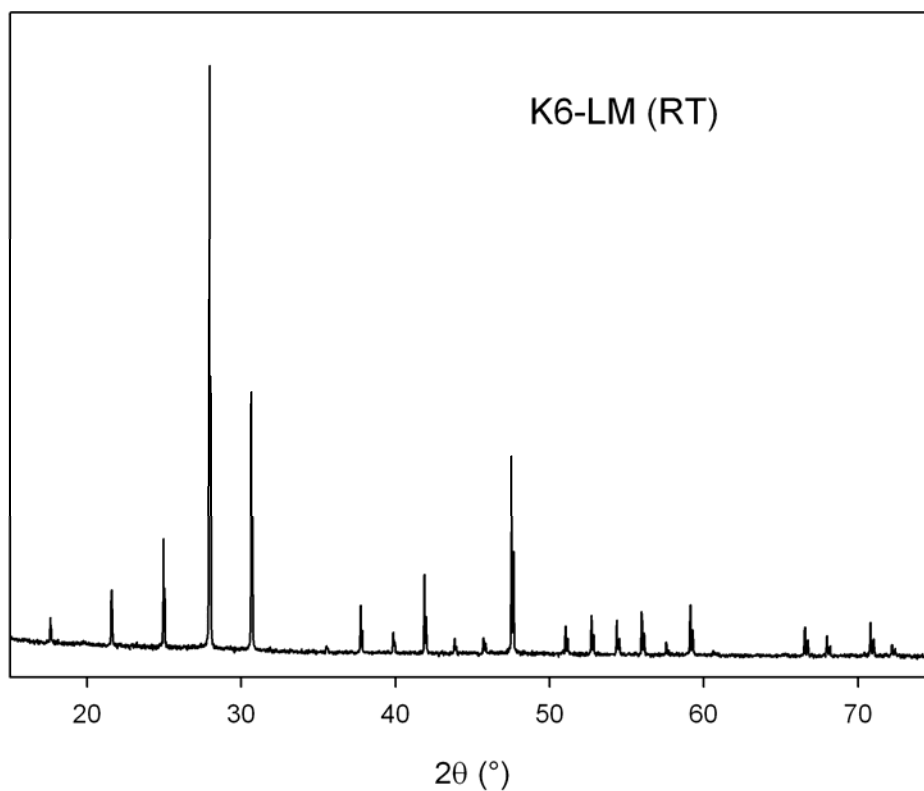


Figure S10 : Room temperature XRD pattern of $\text{La}_{1.88}\text{K}_{0.12}\text{Mo}_2\text{O}_{8.88}$ (K6-LM).

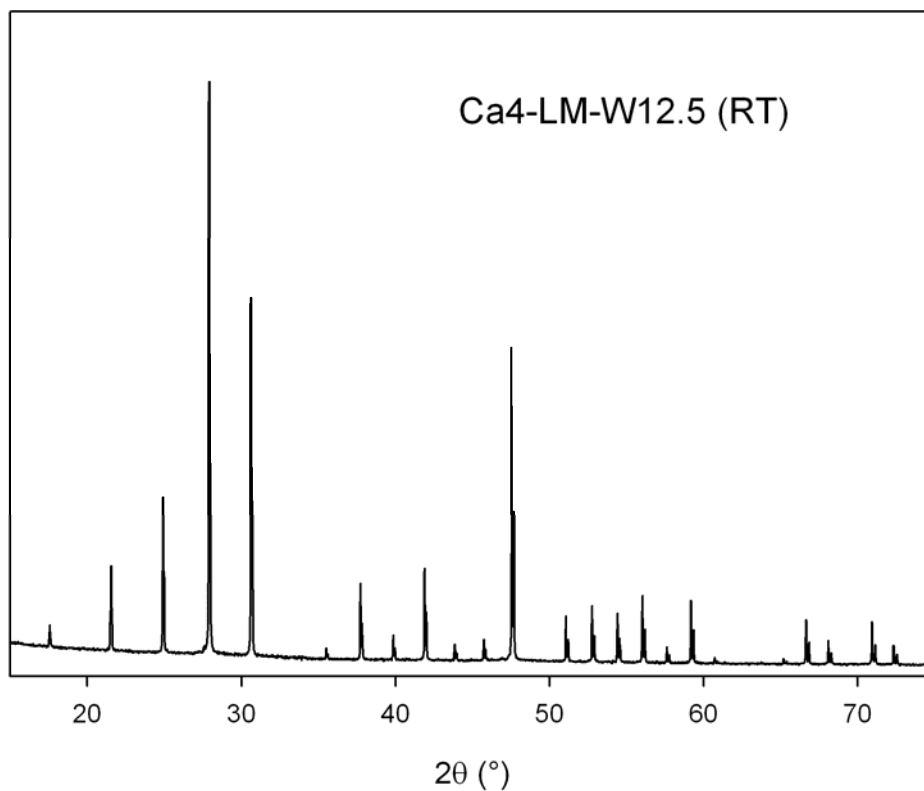


Figure S11 : Room temperature XRD pattern of $\text{La}_{1.92}\text{Ca}_{0.08}\text{Mo}_{1.75}\text{W}_{0.25}\text{O}_{8.96}$ (Ca4-LM-W12.5).

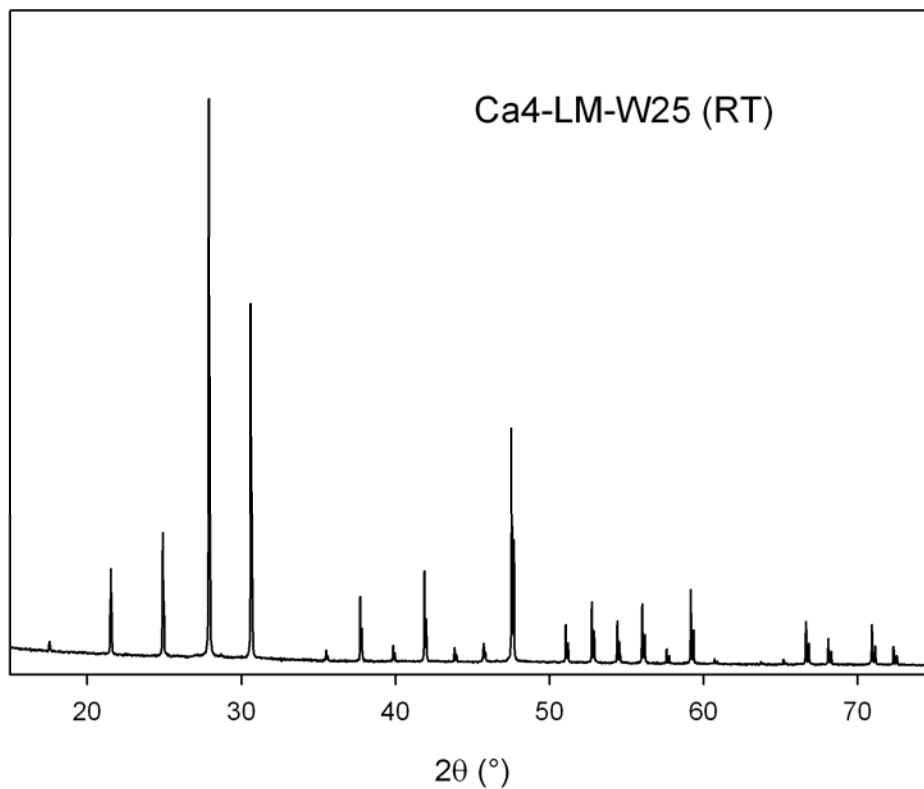


Figure S12 : Room temperature XRD pattern of $\text{La}_{1.92}\text{Ca}_{0.08}\text{Mo}_{1.5}\text{W}_{0.5}\text{O}_{8.96}$ (Ca4-LM-W25).

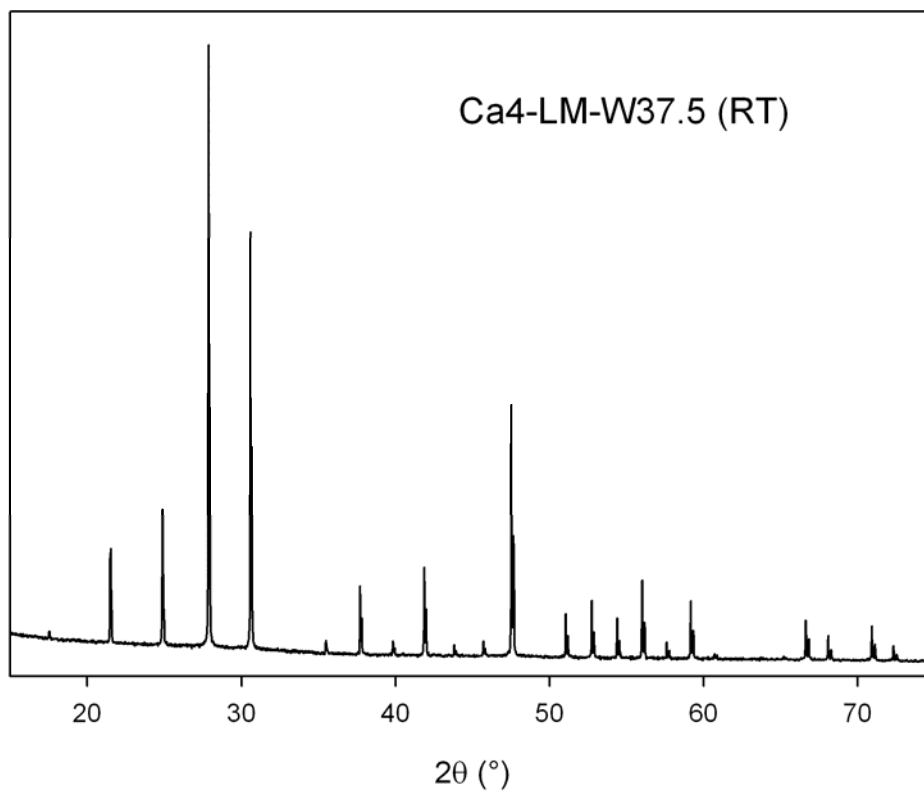


Figure S13 : Room temperature XRD pattern of $\text{La}_{1.92}\text{Ca}_{0.08}\text{Mo}_{1.25}\text{W}_{0.75}\text{O}_{8.96}$ (Ca4-LM-W37.5).

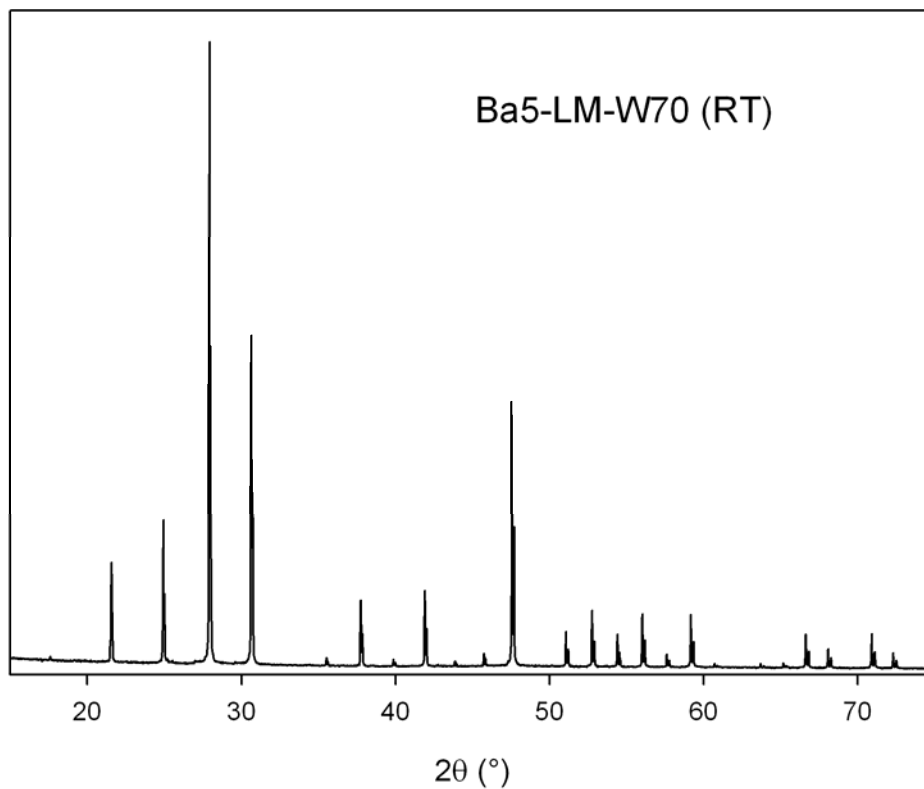


Figure S14 : Room temperature XRD pattern of $\text{La}_{1.9}\text{Ba}_{0.1}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.95}$ (Ba5-LM-W70).

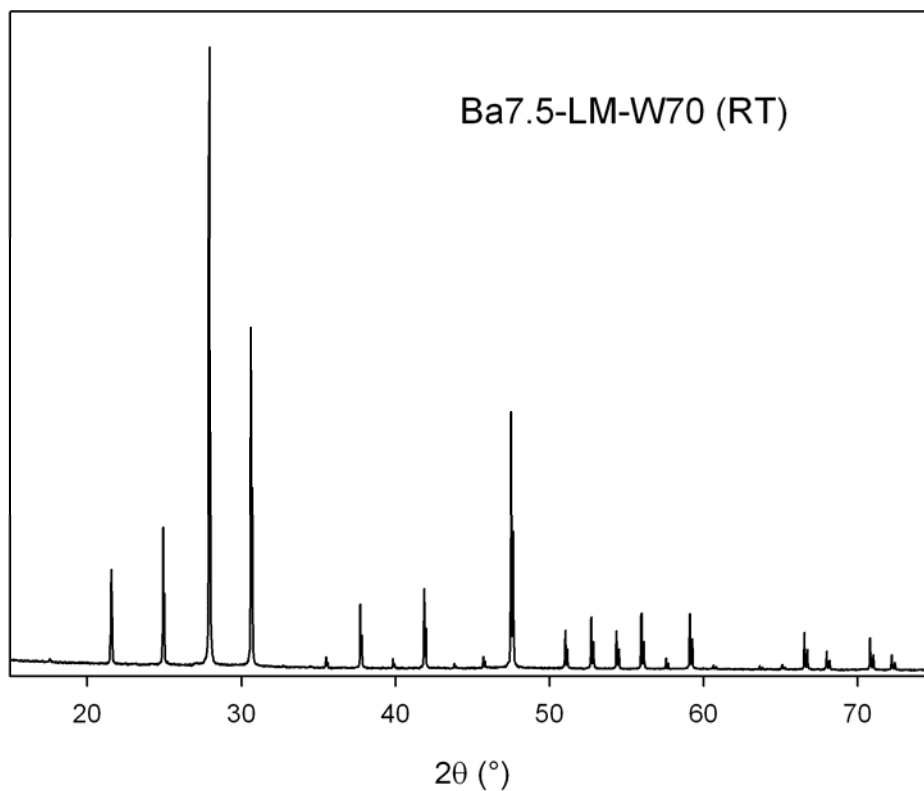


Figure S15 : Room temperature XRD pattern of $\text{La}_{1.85}\text{Ba}_{0.15}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.925}$ (Ba7.5-LM-W70).

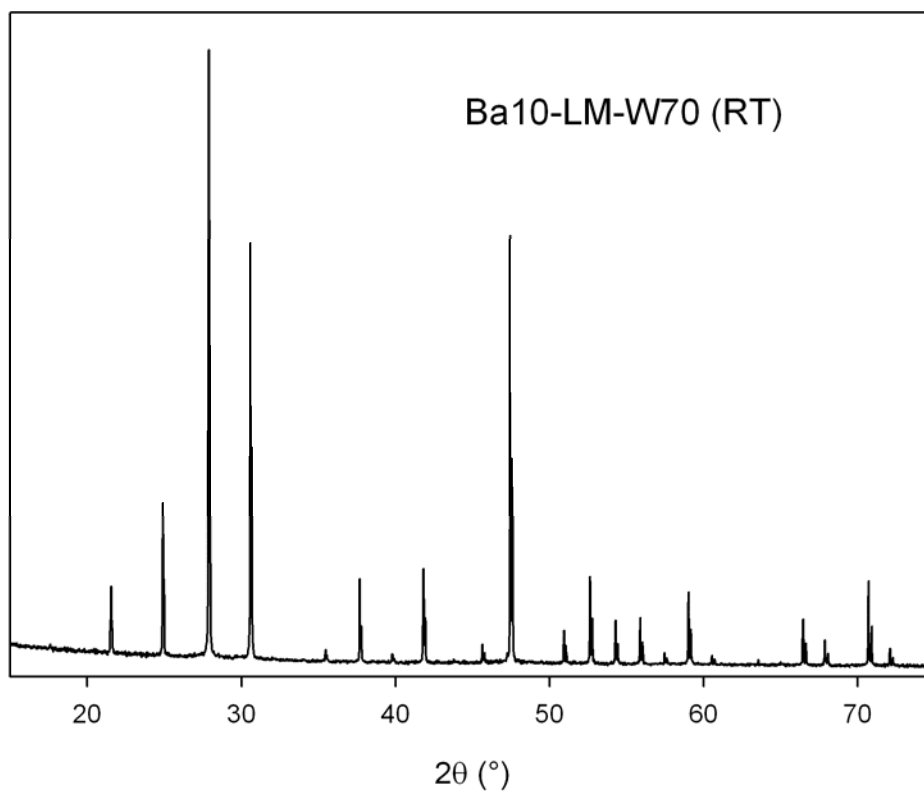


Figure S16 : Room temperature XRD pattern of $\text{La}_{1.8}\text{Ba}_{0.2}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.9}$ (Ba10-LM-W70).

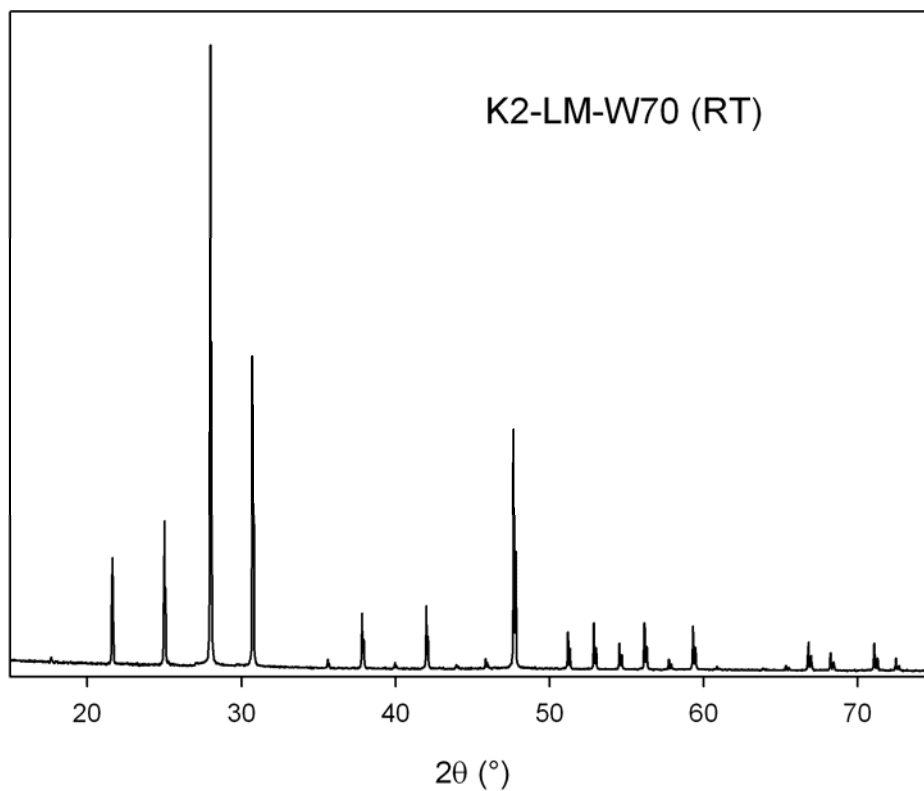


Figure S17 : Room temperature XRD pattern of $\text{La}_{1.96}\text{K}_{0.04}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.96}$ (K2-LM-W70).

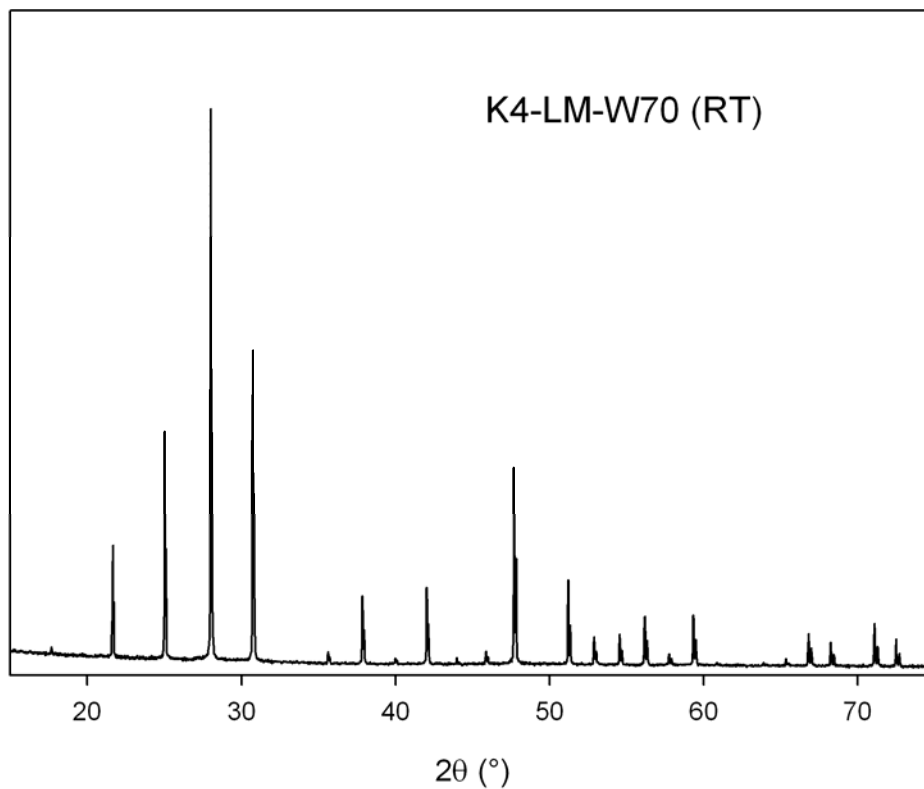


Figure S18 : Room temperature XRD pattern of $\text{La}_{1.92}\text{K}_{0.08}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.92}$ (K4-LM-W70).

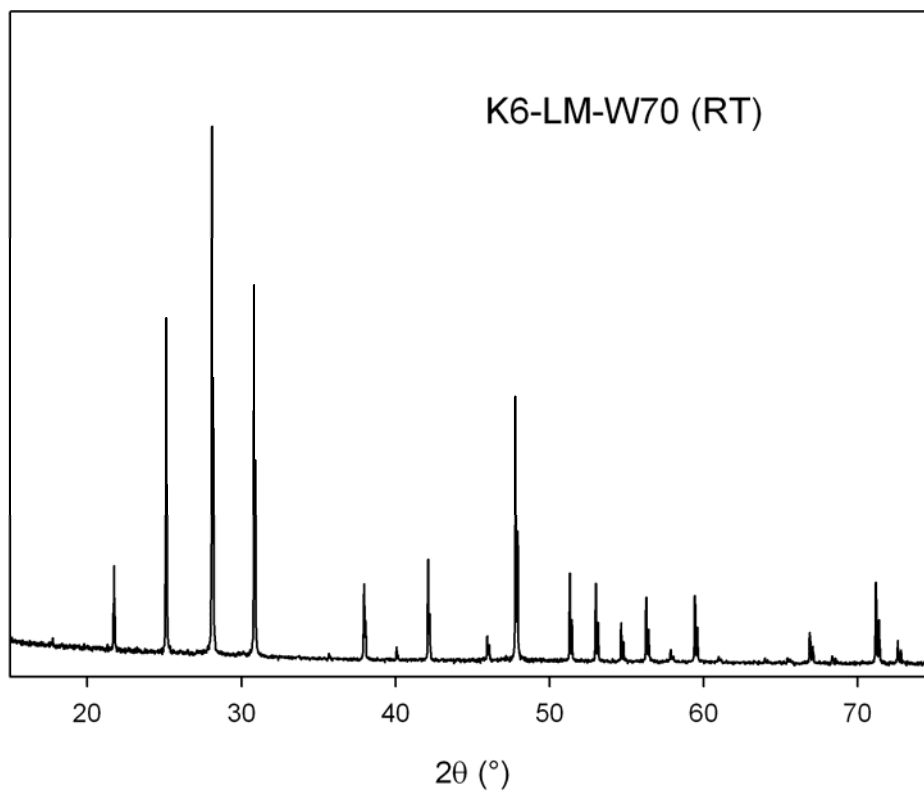


Figure S19 : Room temperature XRD pattern of $\text{La}_{1.88}\text{K}_{0.12}\text{Mo}_{0.6}\text{W}_{1.4}\text{O}_{8.88}$ (K6-LM-W70).