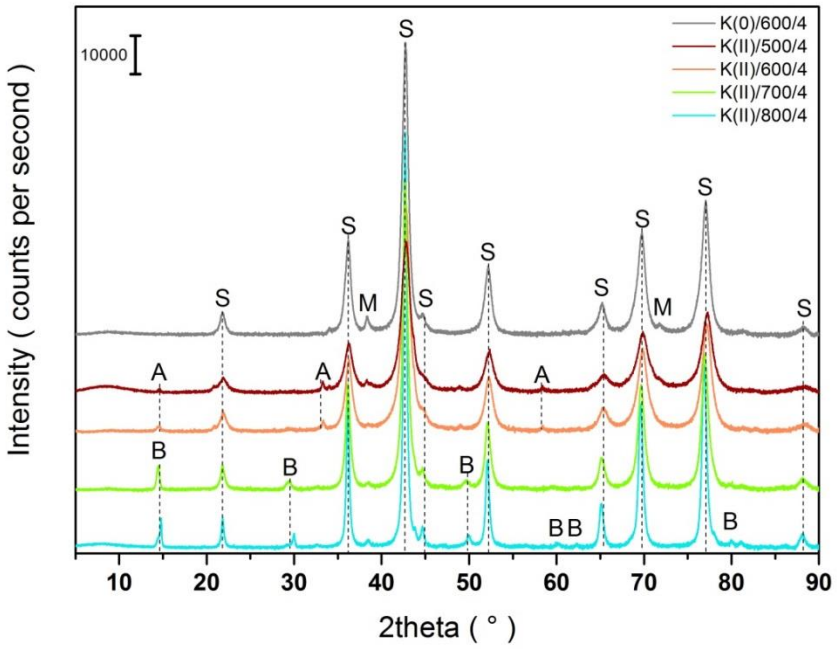


Figure S1. XRD results for samples K(II)/*y*/4. A = cryptomelane (KMn_8O_{16}), B = potassium manganese oxide ($K_2Mn_4O_8$ or $K_{1.39}Mn_4O_8$), S = spinel, M = Mn_2O_3.

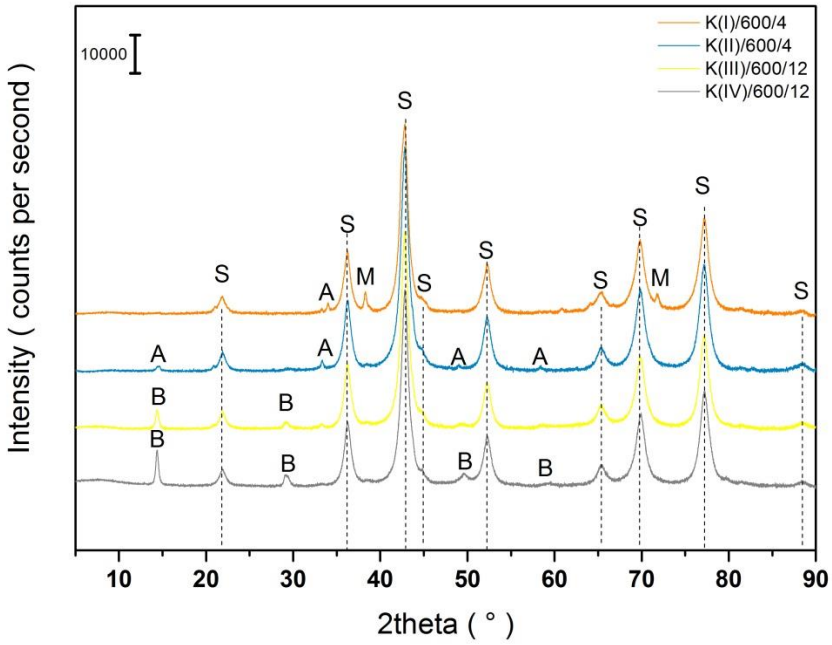


Figure S2. XRD results for samples K(*x*)/600/*z*. A = cryptomelane (KMn_8O_{16}), B = potassium manganese oxide ($K_2Mn_4O_8$ or $K_{1.39}Mn_4O_8$), S = spinel, M = Mn_2O_3.

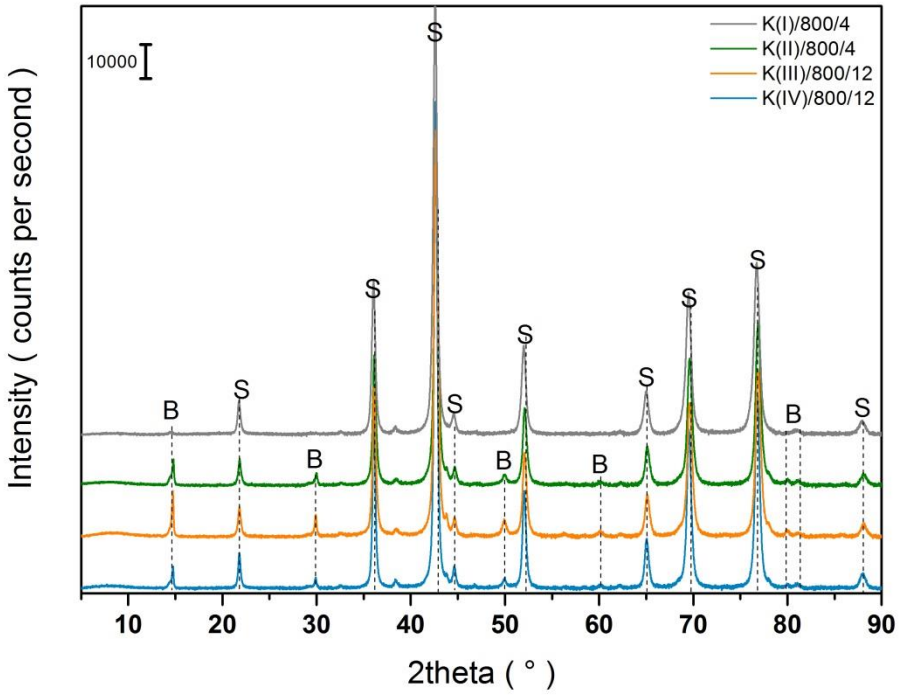


Figure S3. XRD results for samples K(x)/800/z. A = cryptomelane (KMn_8O_{16}), B = potassium manganese oxide ($K_2Mn_4O_8$ or $K_{1.39}Mn_4O_8$), S = spinel, M = Mn_2O_3.

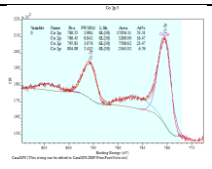
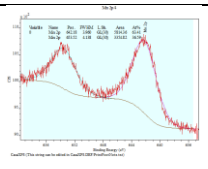
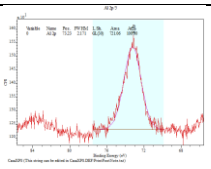
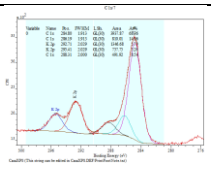
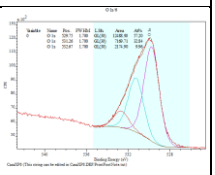
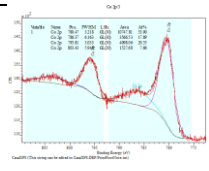
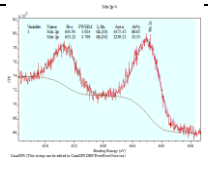
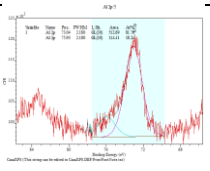
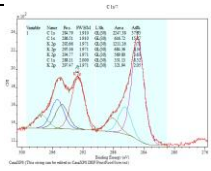
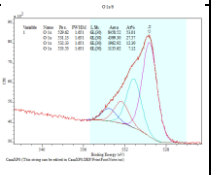
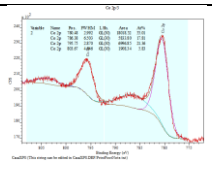
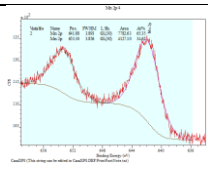
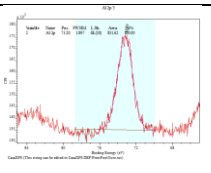
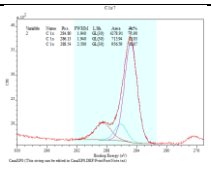
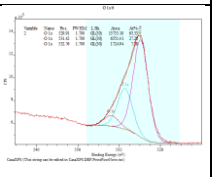
Sample	Co	Mn	Al	K	O
K(II)/500/12 fresh					
K(II)/500/12 used					
K(0)/670/4					

Figure S4. XPS results.

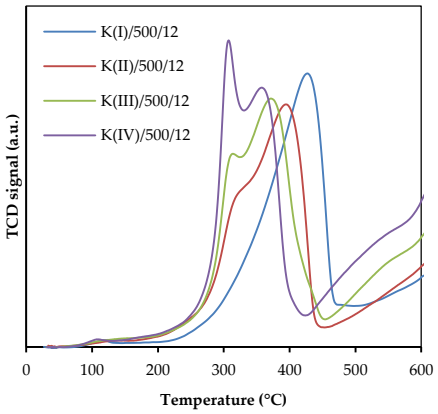


Figure S5. TPR H_2 – effect of potassium amount.

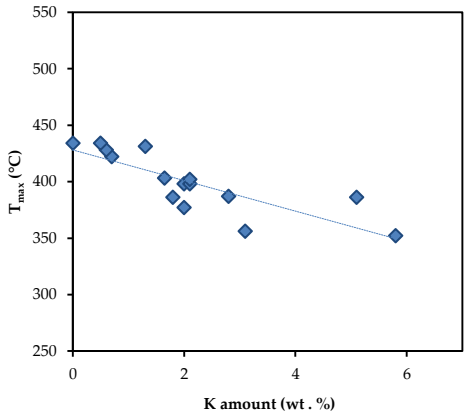


Figure S6 T_{max} (from TPR H_2) dependence on K amount determined by AAS.

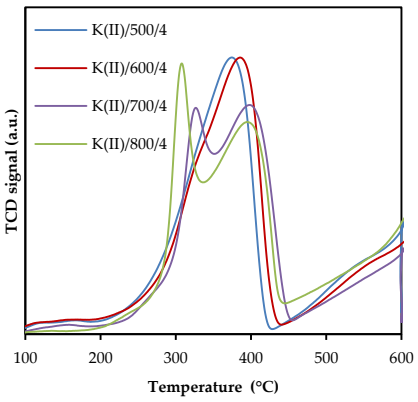


Figure S7 TPR H_2 – effect of calcination temperature for samples K(II)/*y*/4.

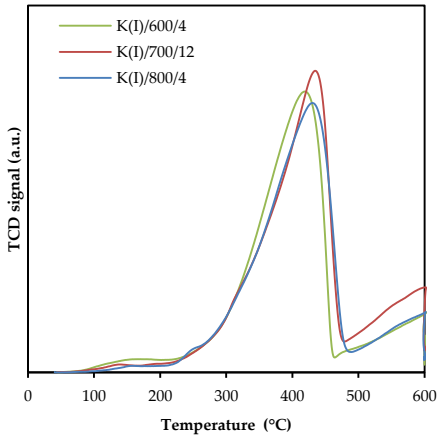


Figure S8 TPR H_2 – effect of calcination temperature for samples K(I)/*y*/*z*.

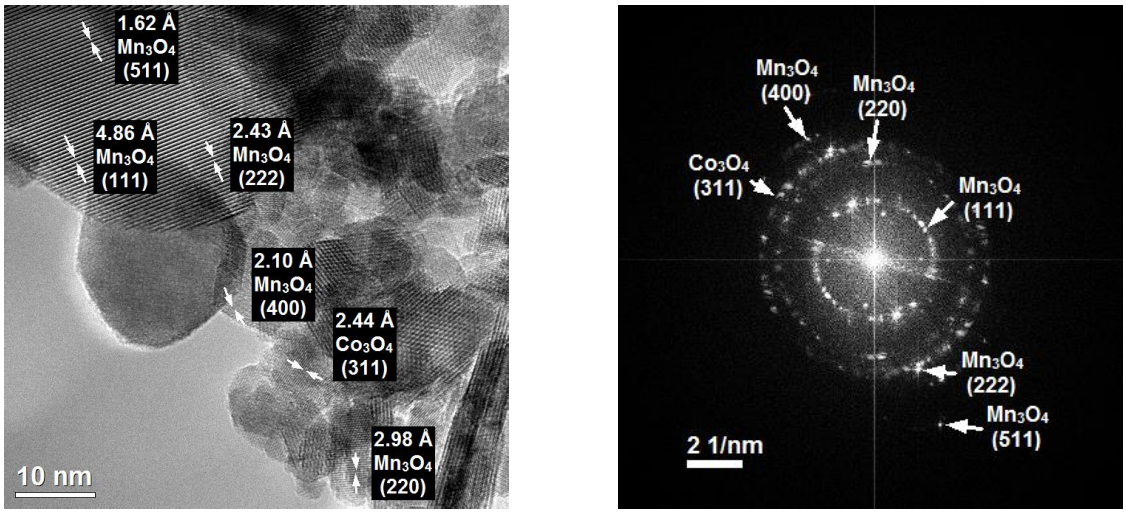


Figure S9 HRTEM image with FFT and phase identification for sample K(II)/600/4.

Table S10 Work function of selected samples.

Sample	**K(IV)/500/12**	**K(IV)/600/12**	**K(IV)/700/12**	**K(IV)/800/12**
Conditions	**Work function (eV)**			
Air + room temperature	4.7	4.7	4.6	4.7
Vacuum + room temperature	4.4	4.3	4.1	4.0
Vacuum + 150 °C	3.8	3.9	3.8	3.7
Vacuum + room temperature 2	3.8	3.9	3.8	3.8