Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Synthesis and Electrochemical Studies of Novel Phosphite Based Layered Cathodes for Li-ion Batteries

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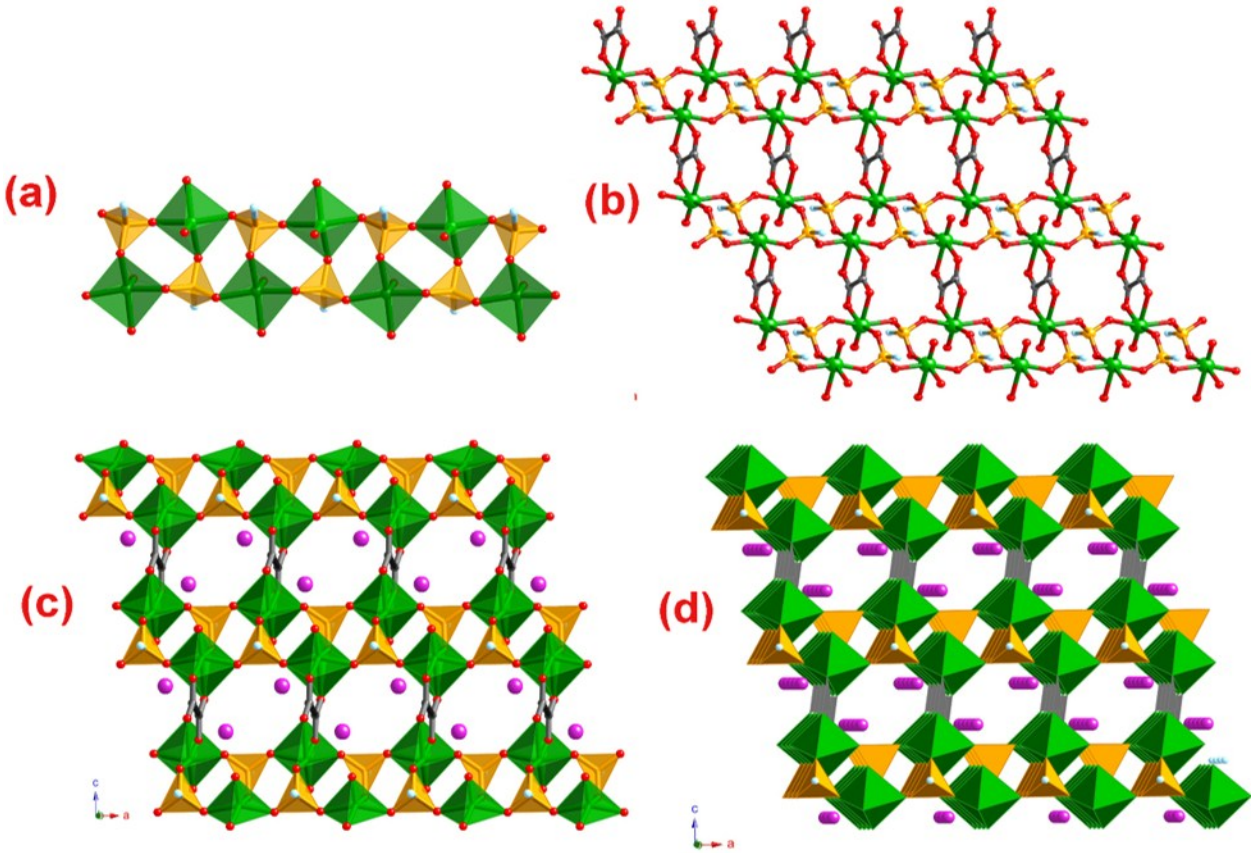

Fig. S1. Crystal structure of $Na_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 2H_2O$; (a) View of $VOHPO_3$ chains; (b and c) View of $[(VO)_2(HPO_3)_2(C_2O_4)]$ layer along (01-1) plane formed by interlinking of $VOHPO_3$ chains by oxalate ligands;(b) ball and stick model and (c) polyhedral model with Na ions in the channel; (d) Stacking of the anionic layers along *c*-axis result in the layered structure with Na^+ ions between the layers. The water molecules present in between layers are not shown for clarity

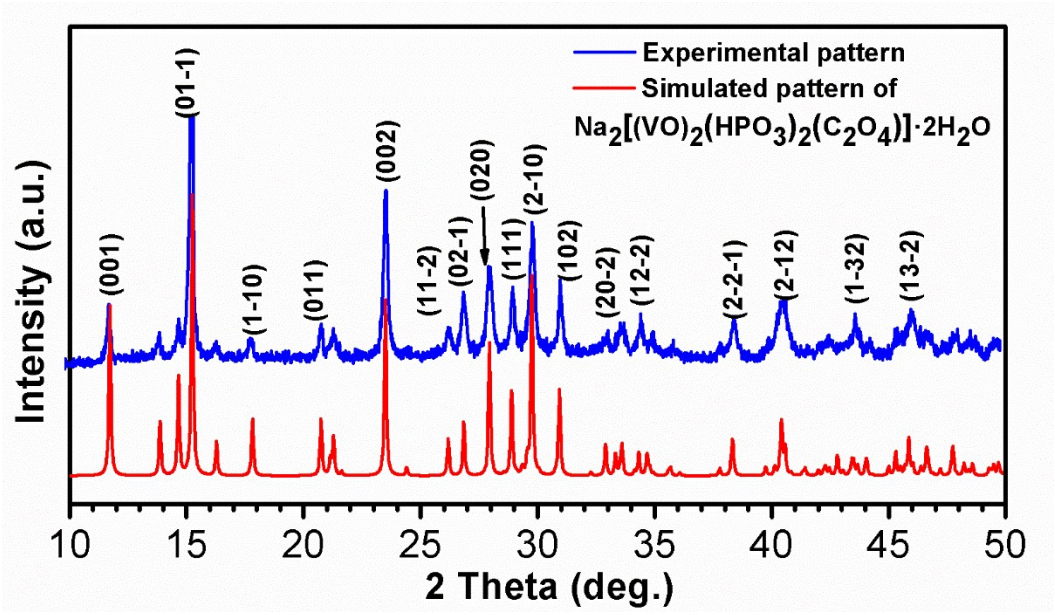

Fig. S2. Comparison of PXRD pattern of bulk $Na_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 2H_2O$ powder (red) with its simulated pattern (blue)

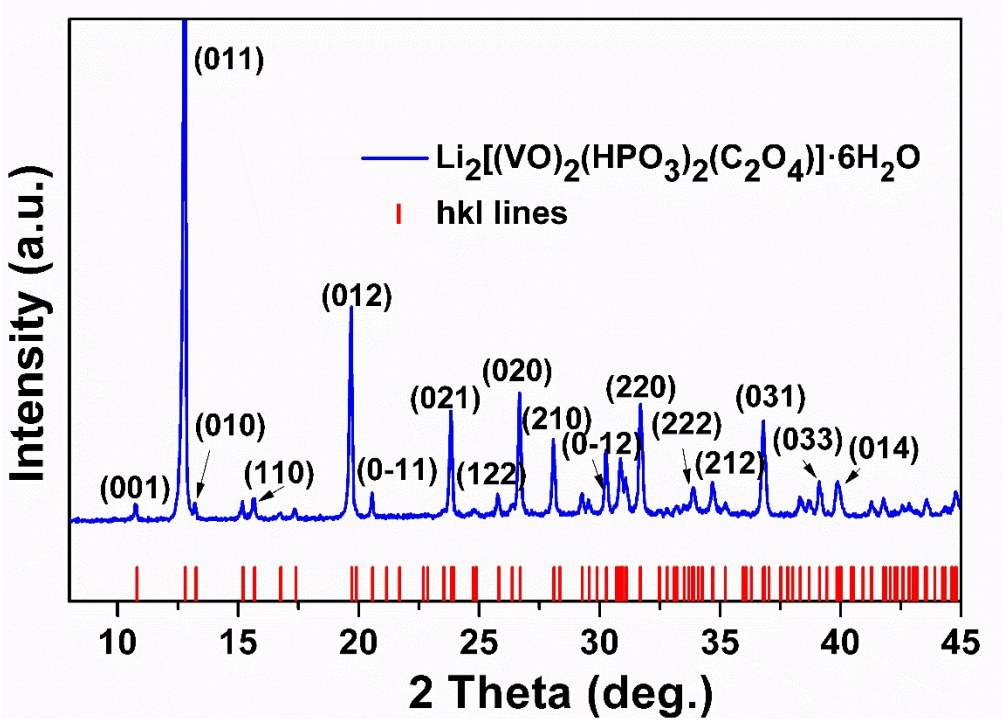

Fig. S3. PXRD pattern of $Li_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 6H_2O$ powder (blue) compared with its literature report (hkl lines are indicated in red)

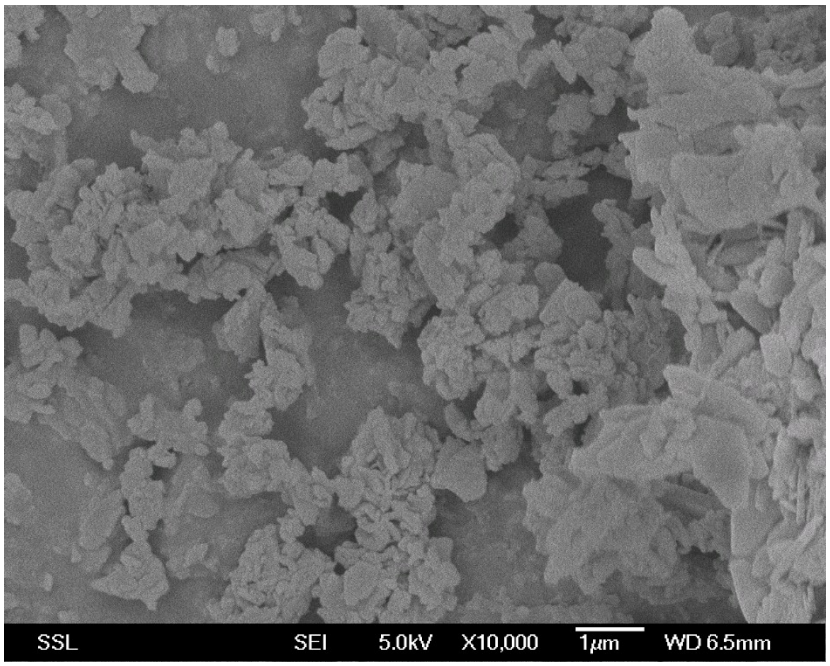

Fig. S4. SEM micrograph of rGO/$Li_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 6H_2O$ composite.

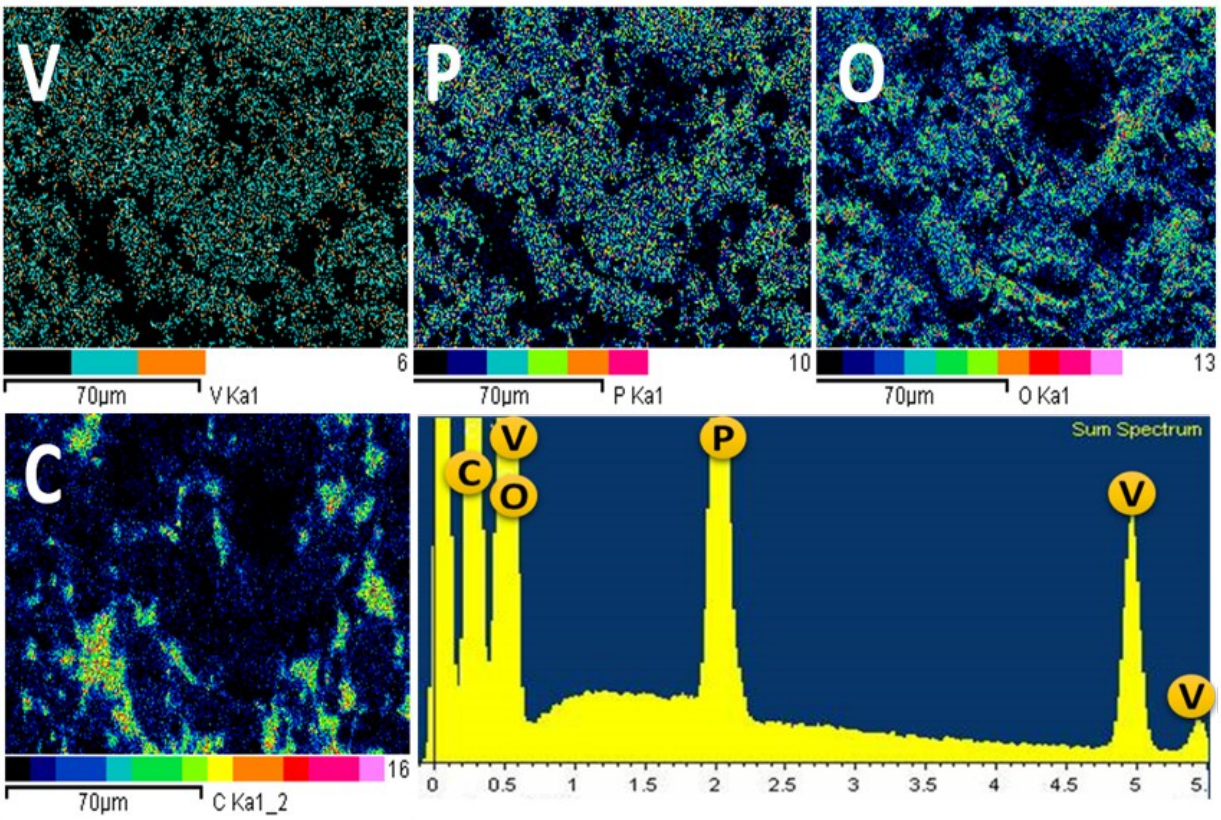

Fig. S5. EDX element mapping of $Li_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 6H_2O$ for V, P, C and O along with the EDX spectrum

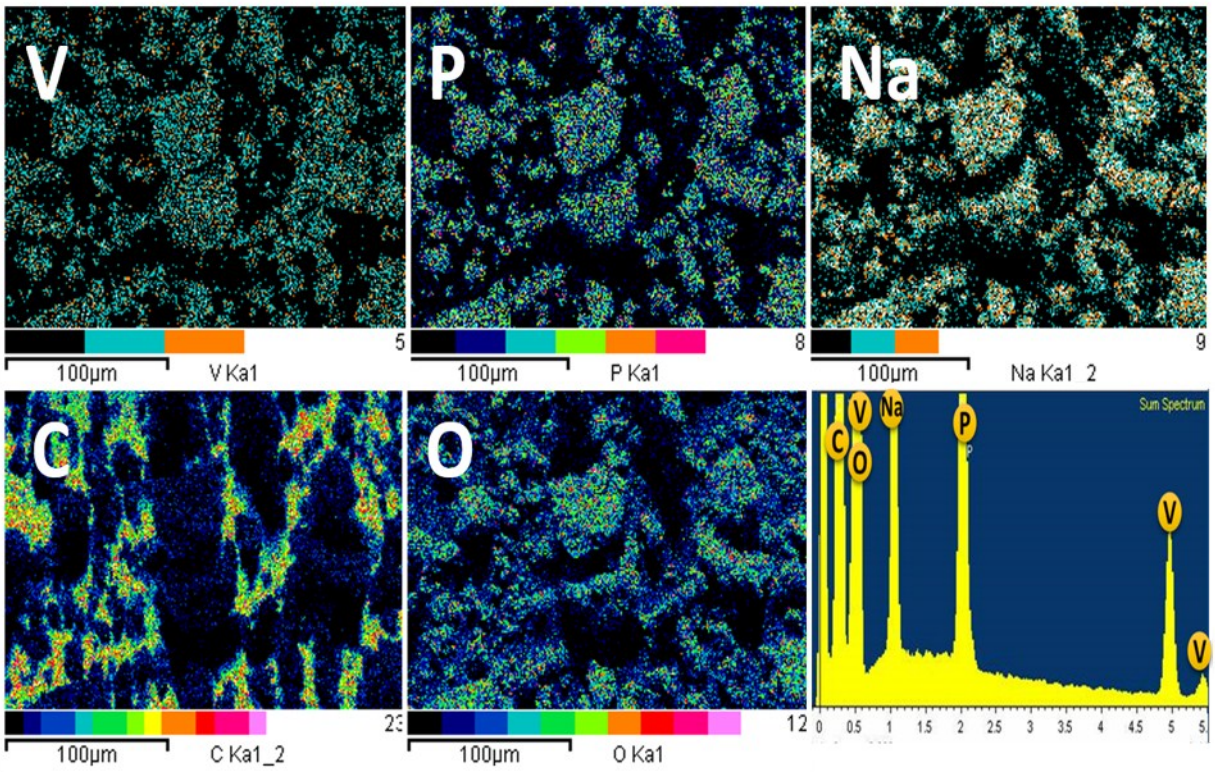

Fig. S6. EDX element mapping of $Na_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 2H_2O$ for V, P, Na, C and O along with the EDX spectrum

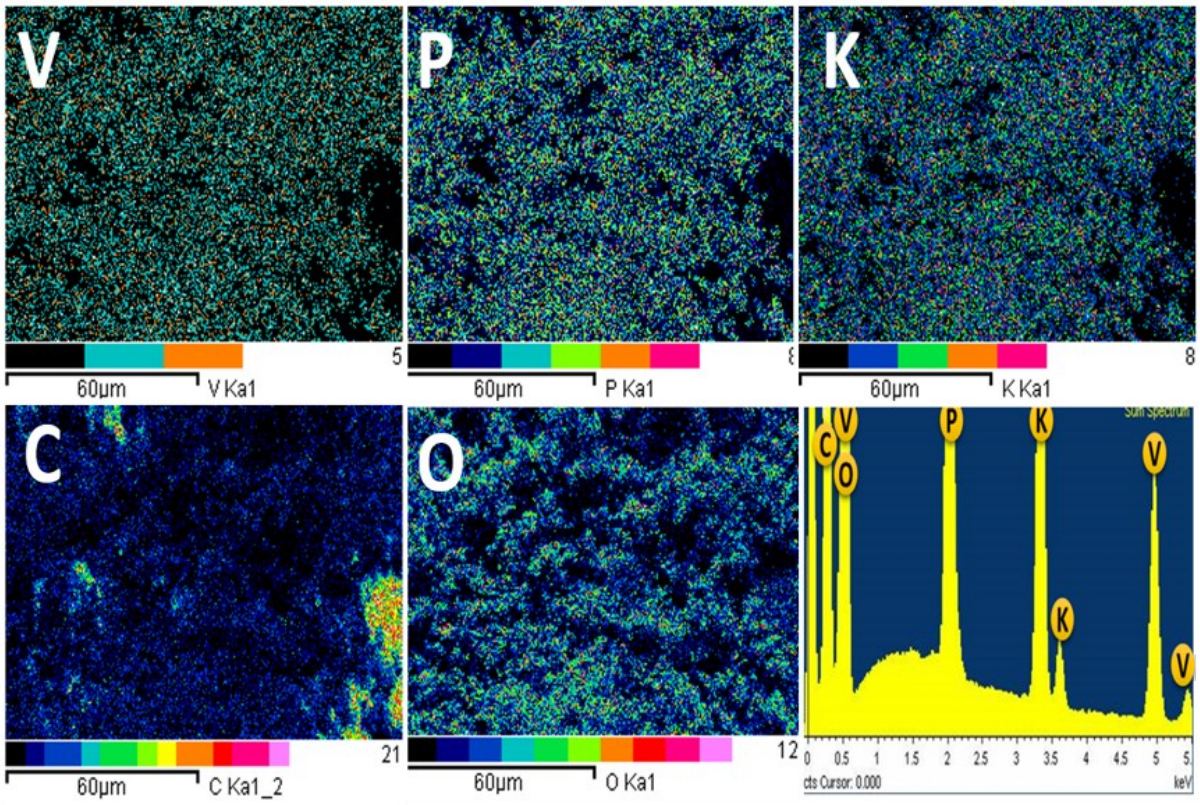

Fig. S7. EDX element mapping of $K_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 3H_2O$ for V, P, K, C and O along with the EDX spectrum

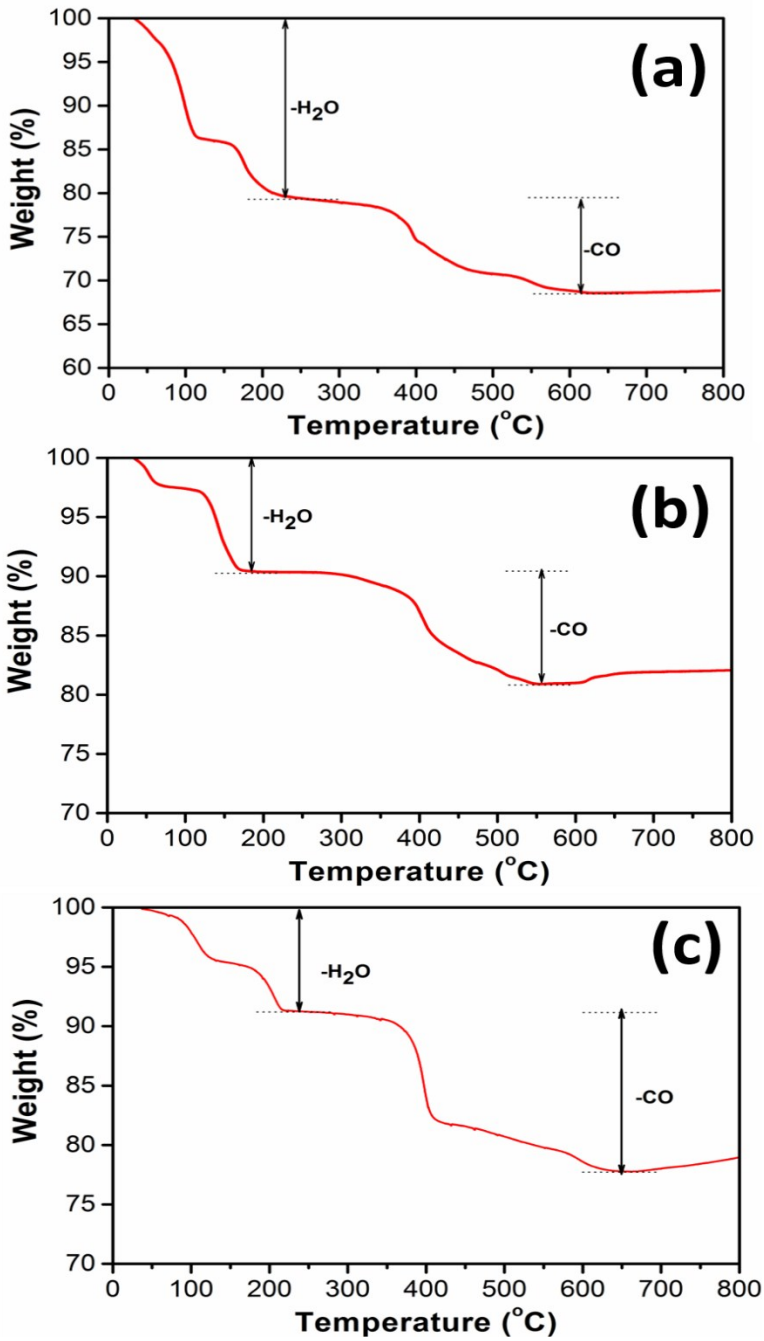

Fig. S8. Thermogravimetric analysis (TGA) of (a) $Li_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 6H_2O$; (b) $K_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 3H_2O$ and (c) $Na_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 2H_2O$ recorded in N_2 atmosphere at a heating rate of 5 $^oC\ min^{-1}$

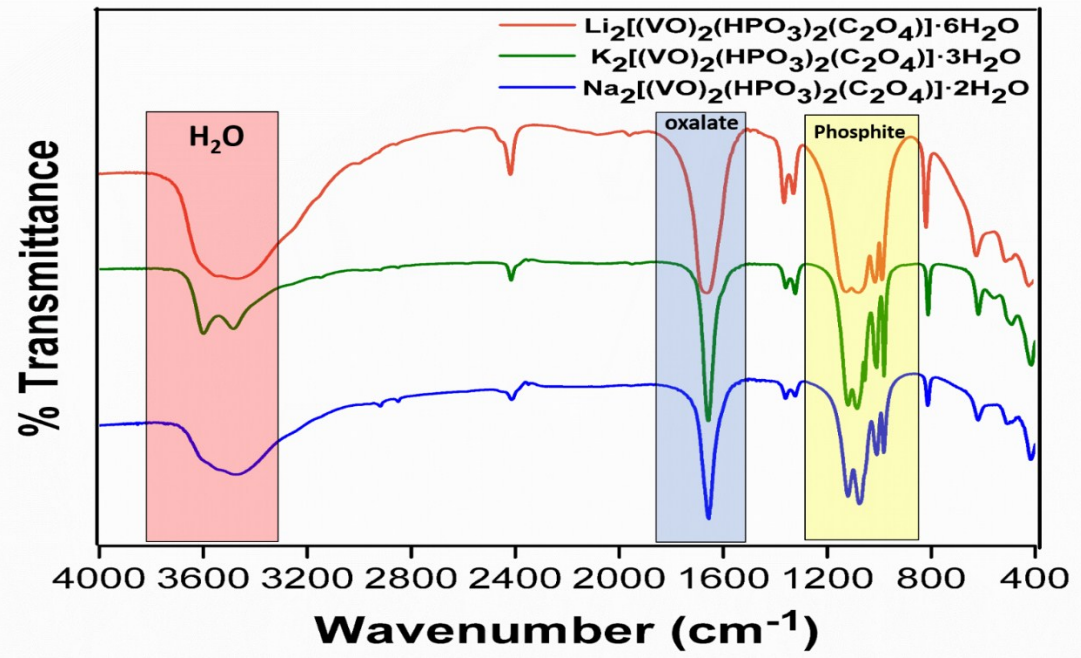

Fig. S9. Infra Red spectra of $Li_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 6H_2O$, $K_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 3H_2O$ and $Na_2[(VO)_2(HPO_3)_2(C_2O_4)]\cdot 2H_2O$