Supplementary information

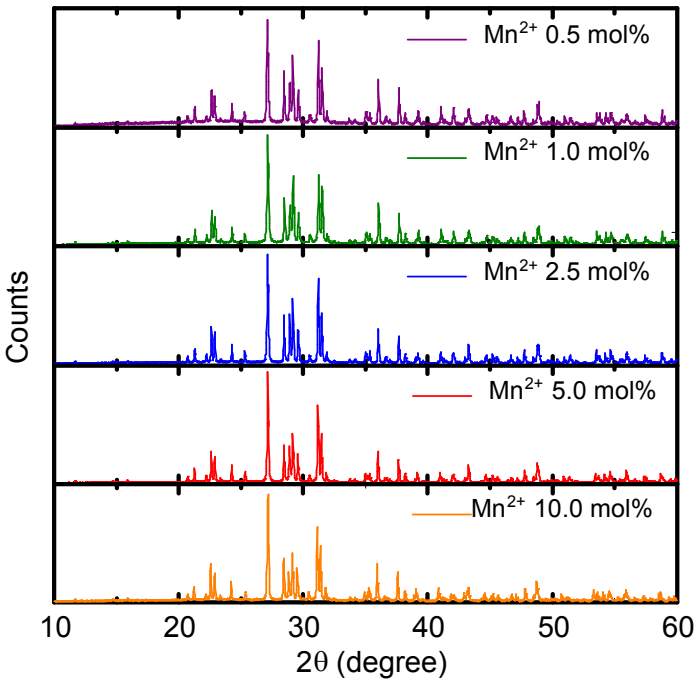

Fig. S1. XRD patterns for β-$Zn_3(PO_4)_2$:Mn^{2+}_y (y = 0.005, 0.010, 0.025, 0.500, 0.100). These data are in good agreement with those in PDF 00-030-1489.

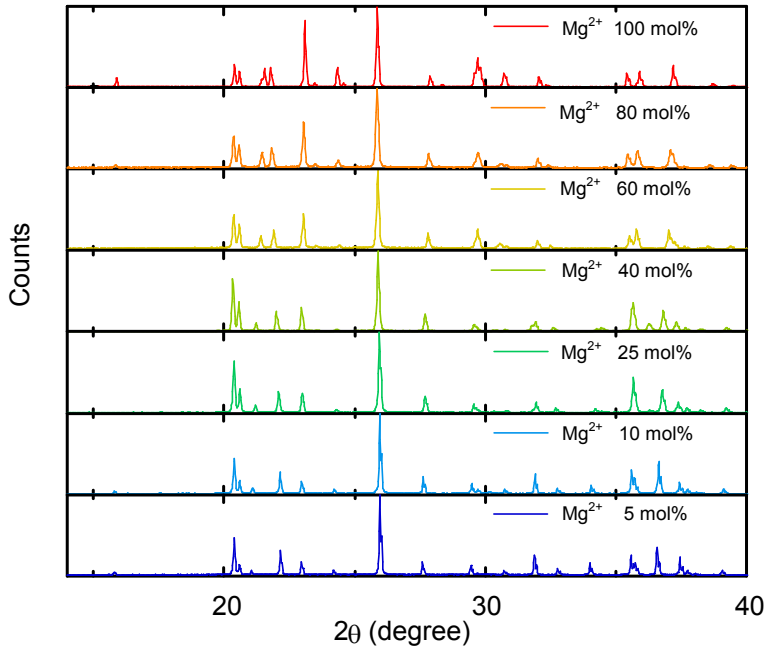

Fig. S2. XRD patterns for γ-$(Zn_{1-x}Mg_x)_3(PO_4)_2$:Mn^{2+} (x = 0.05, 0.25, 0.40, 0.60, 0.80, 1.00). These data are in good agreement with those in PDF: Zn^{2+}:Mg^{2+}=0:100 (PDF 00-033-0876), Zn^{2+}:Mg^{2+}=20:80 (PDF 01-081-0777), Zn^{2+}:Mg^{2+}=40:60 (PDF 01-081-0776), Zn^{2+}:Mg^{2+}=60:40 (PDF 00-031-1468), Zn^{2+}:Mg^{2+}=75:25 (PDF 01-081-0774), Zn^{2+}:Mg^{2+}=95:5 (PDF 00-030-1490).

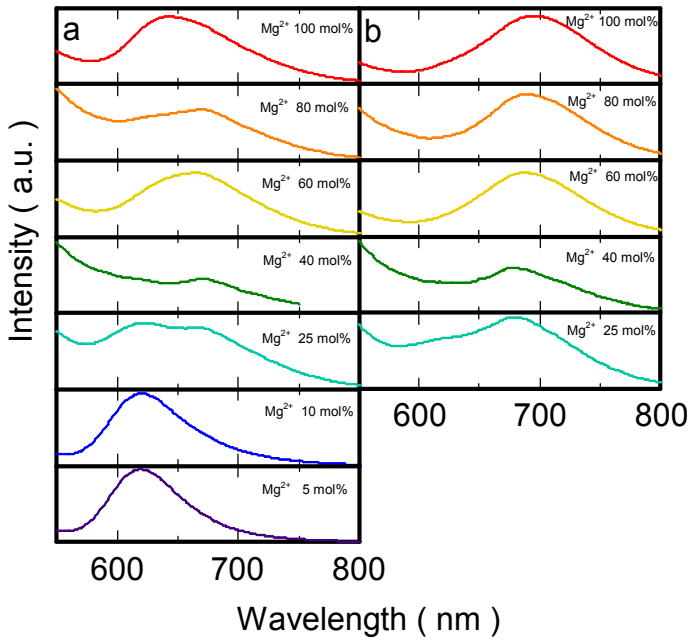

Fig. S3. PL emission spectra of γ-$(Zn_{1-x}, Mg_x)_3(PO_4)_2$:$Mn^{2+}_{0.05}$ (x = 0.05, 0.10, 0.25, 0.40, 0.60, 0.80, 1.00) excited at 404 nm (a) and 416 nm (b), where x corresponds to the concentration of Mg^{2+} ion in mol% in crystal.