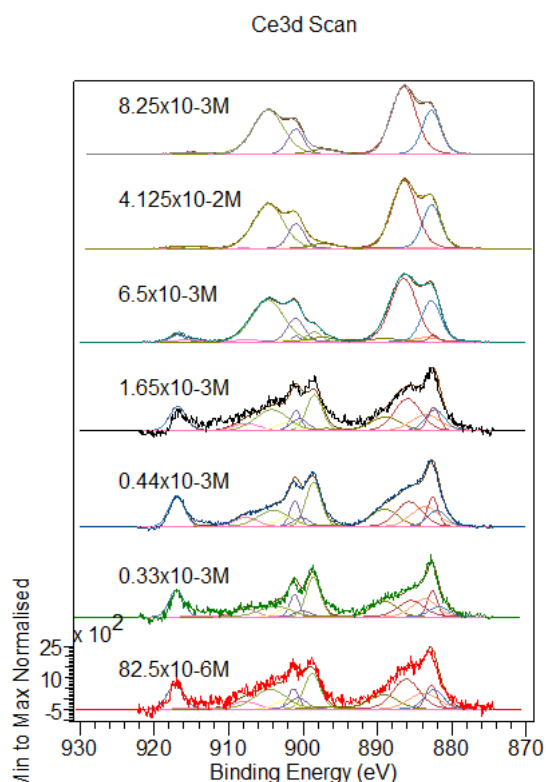


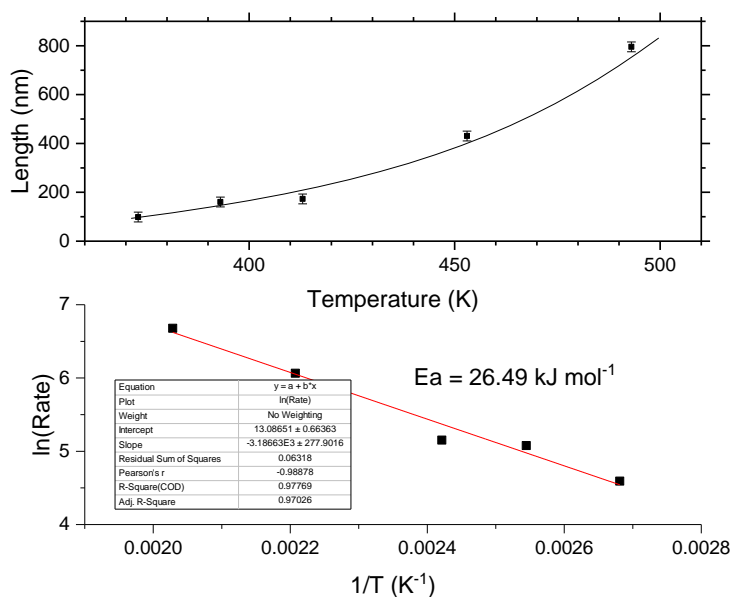
## **Tuning the structure of cerium phosphate nanorods**

**Lisa Allen, Josh A. Davies-Jones\*, Philip R. Davies\*, Sarah King and Padraic O'Reilly**

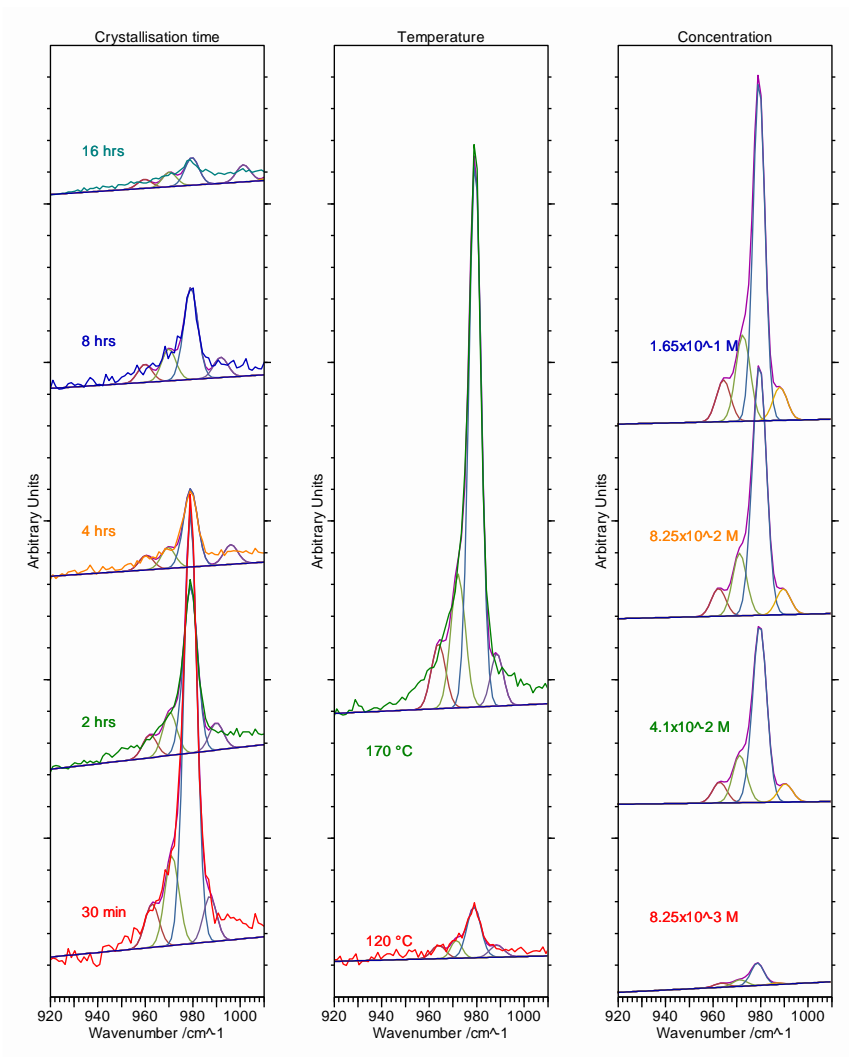
### **Electronic Supplementary Information**



**Figure S1:** XP spectra of cerium phosphate nanoparticles for changing phosphate concentrations. Curve fits use models of Ce(III) and Ce(IV) constructed from spectra of standards.



**Figure S2: Top:** Graph of  $\text{CePO}_4$  nanorod length against synthesis temperature. **Bottom:** Arrhenius plot using nanorod length as a measure of rate of growth



**Figure S3: Raman Spectra of phosphate nanoparticles prepared at different temperatures.**

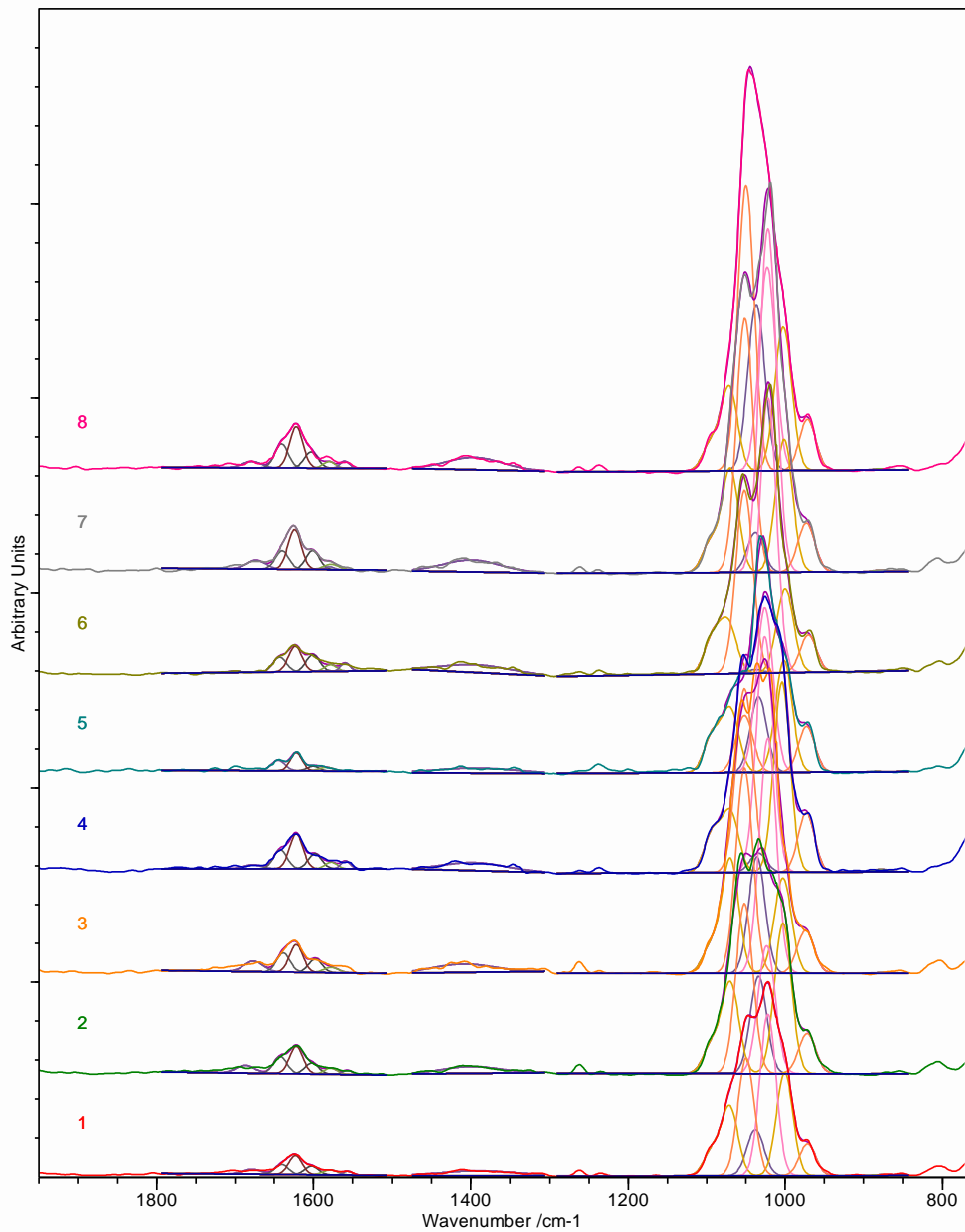
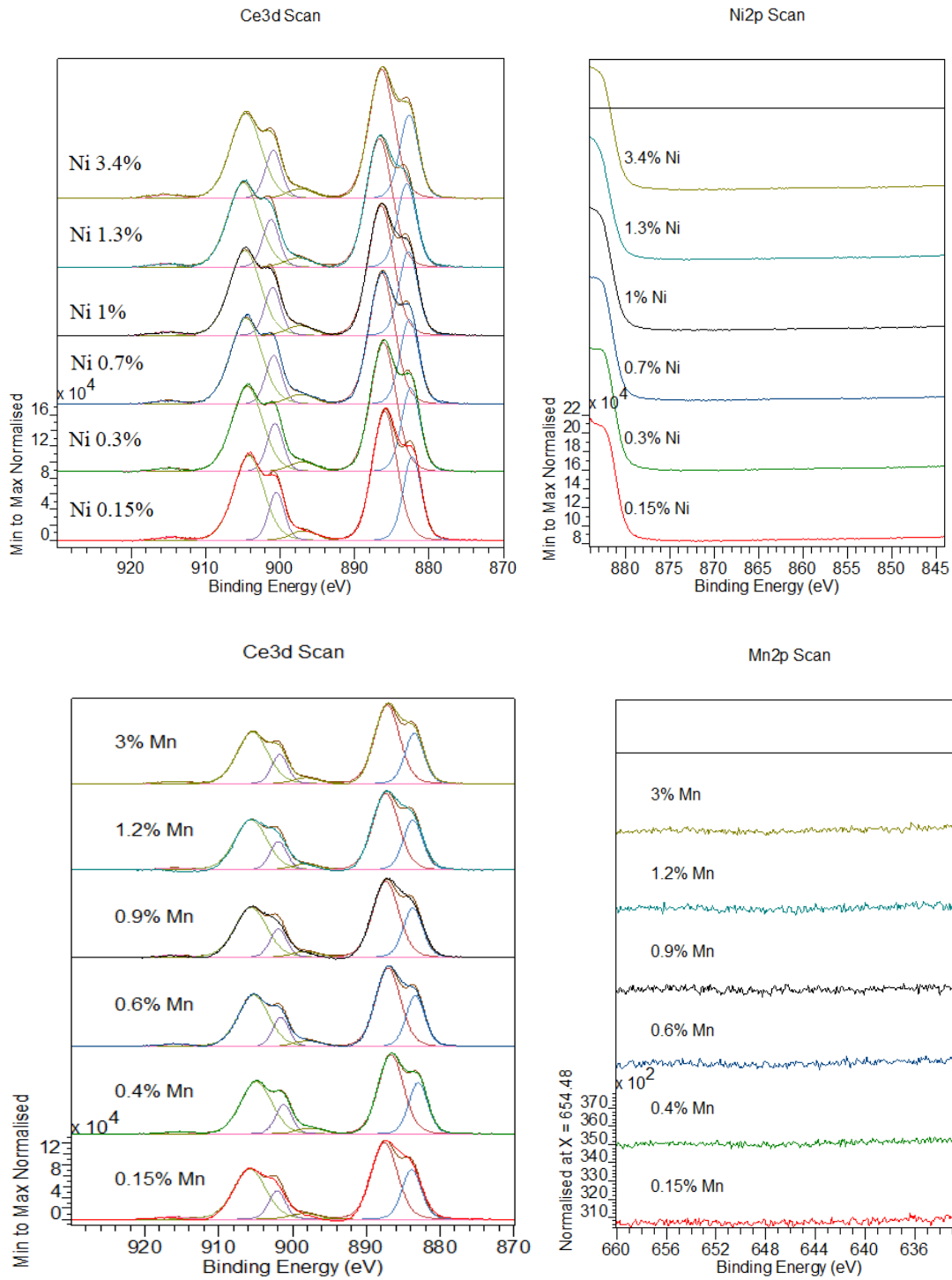


Figure S4: PiFM spectra from Nanorods in Figure 5



**Figure S5:** XPS spectra of doped cerium phosphate nanoparticles.

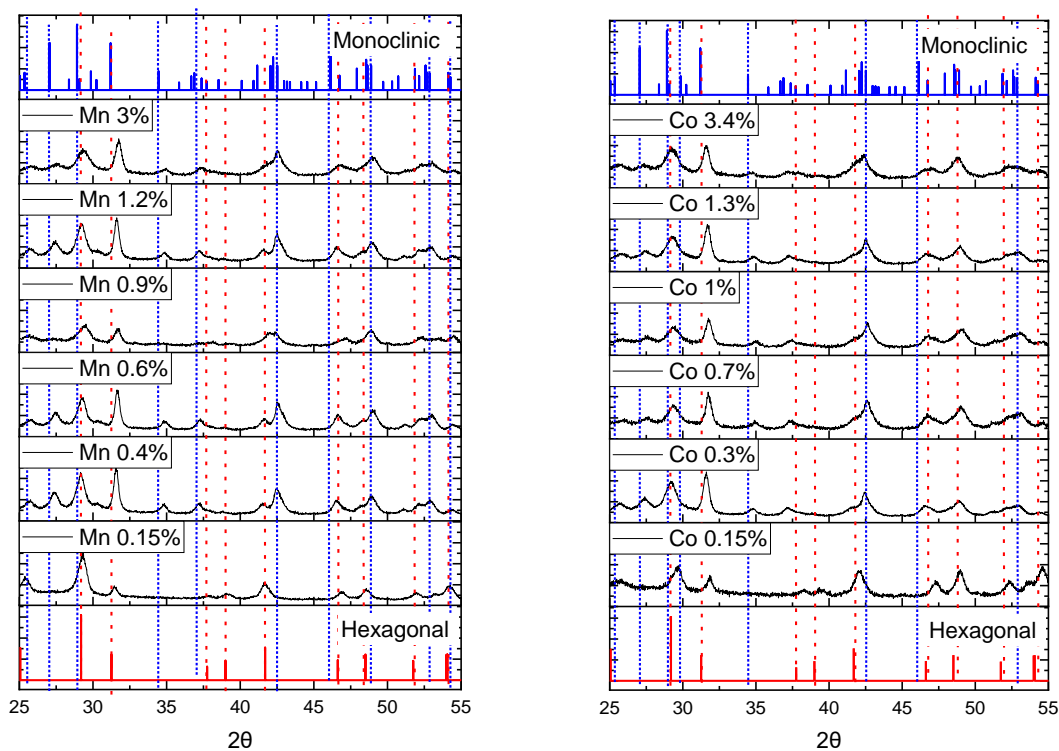


Figure S6. XRD of doped-Cerium nanoparticles prepared at different amounts of Co and Mn with  $8.25 \times 10^{-2}$  M potassium phosphate at 170 °C. With reference samples from the ICDDMS data base for hexagonal and monoclinic  $\text{CePO}_4$ .

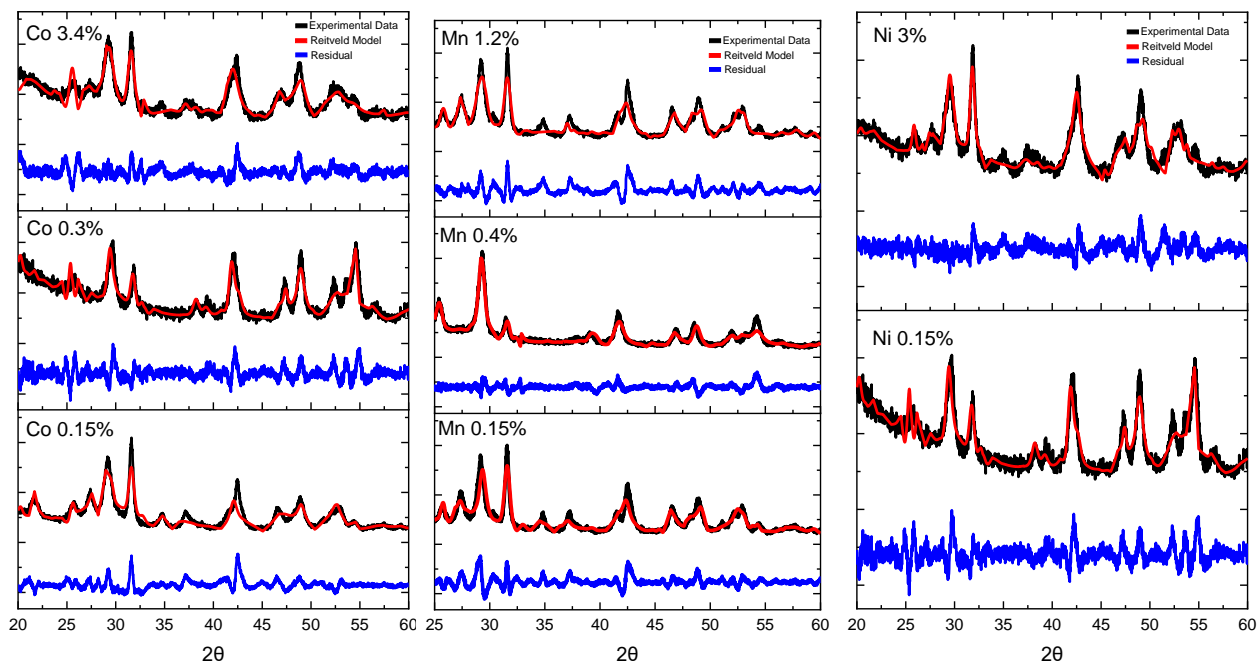
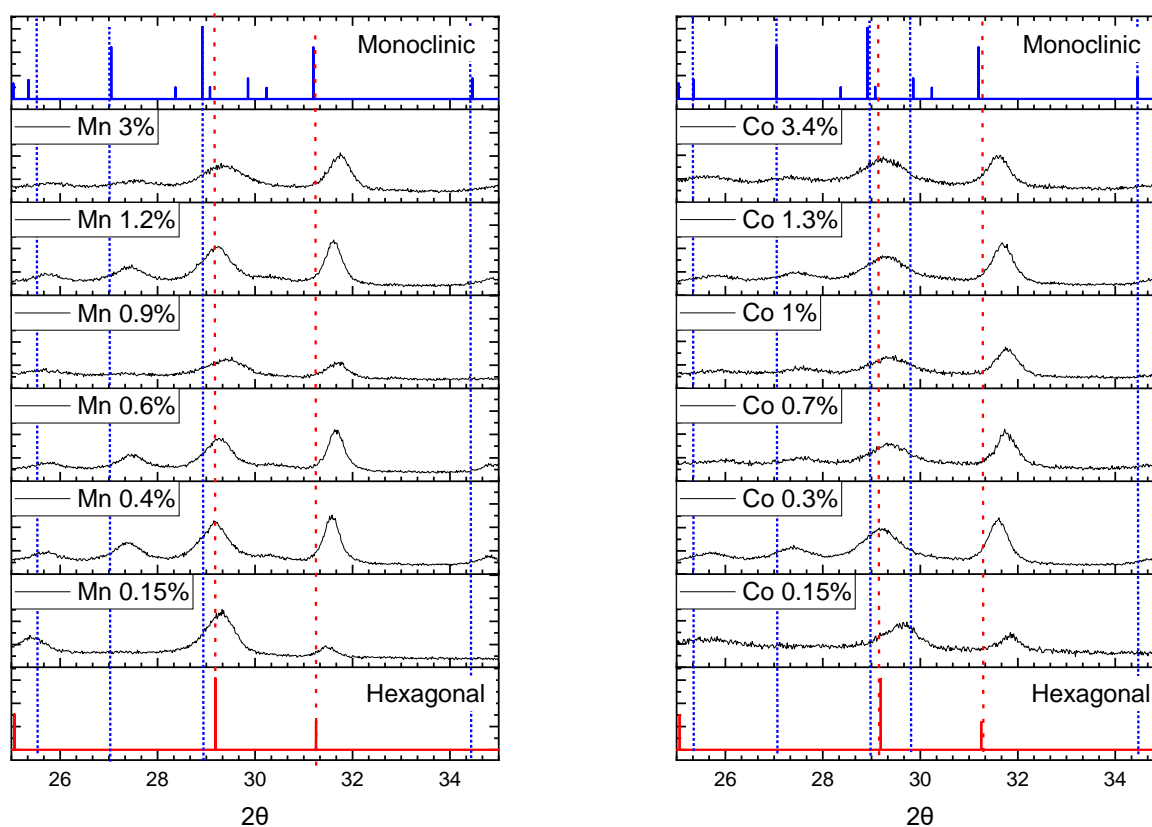


Figure S7: Rietveld analysis

Element (Doping %)	Hexagonal %	Monoclinic %	Cerium Oxide %	$\chi^2$	$R_p$	$R_{wp}$
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Co 0.15%	98.47	1.53	0.01	1.3	11.6	14.9
Co 0.3%	78.90	21.10	0.00	3.41	9.97	12.6
Co 0.7%	84.23	15.77	0.00	1.57	4.92	6.28
Co 1.3%	79.16	19.75	1.10	2.74	6.22	8.32
Co 3.4%	74.64	25.36	0.00	3.98	8.78	11.4
Mn 0.15%	95.63	4.18	0.19	9.7	12.2	15.2
Mn 0.4%	58.23	41.77	0.00	4.21	8.56	11.6
Mn 0.9%	64.85	35.15	0.00	2.71	6.19	8.31
Mn 1.3%	66.04	33.96	0.00	3.37	11.5	14.5
Mn 3%	71.72	28.28	0.00	3.71	10.0	11.9
Ni 0.15%	80.49	36.49	0.00	5.02	9.66	12.6
Ni 0.3%	58.14	41.86	0.00	3.49	5.80	8.04
Ni 0.7%	65.17	33.51	1.31	2.13	4.66	6.17
Ni 1%	76.16	23.57	0.26	1.35	7.75	9.81
Ni 1.3%	57.45	40.27	2.28	2.80	5.19	7.08
Ni 3.4%	63.09	36.36	0.55	3.36	8.62	11.1

**Table S1 Results of Rietveld analysis of Mn, Co and Ni doped cerium phosphate nanoparticles using Super Professor.**



**Figure S8. XRD of doped-Cerium nanoparticles between 27° and 31° prepared at different amounts of Ni, Co and Mn with  $8.25 \times 10^{-2}$  M potassium phosphate at 170 °C. With reference samples from the ICDS data base for hexagonal and monoclinic  $\text{CePO}_4$ .**