Electronic Supplementary Material (ESI) for RSC Advances

Supporting Information

Figure S1. a) TEM image of *m*- $LaVO_4$ nanoparticles along with SAED pattern as inset, b) corresponding HRTEM image [Experimental conditions: T=210^{o}C, t=4h, pH=9].

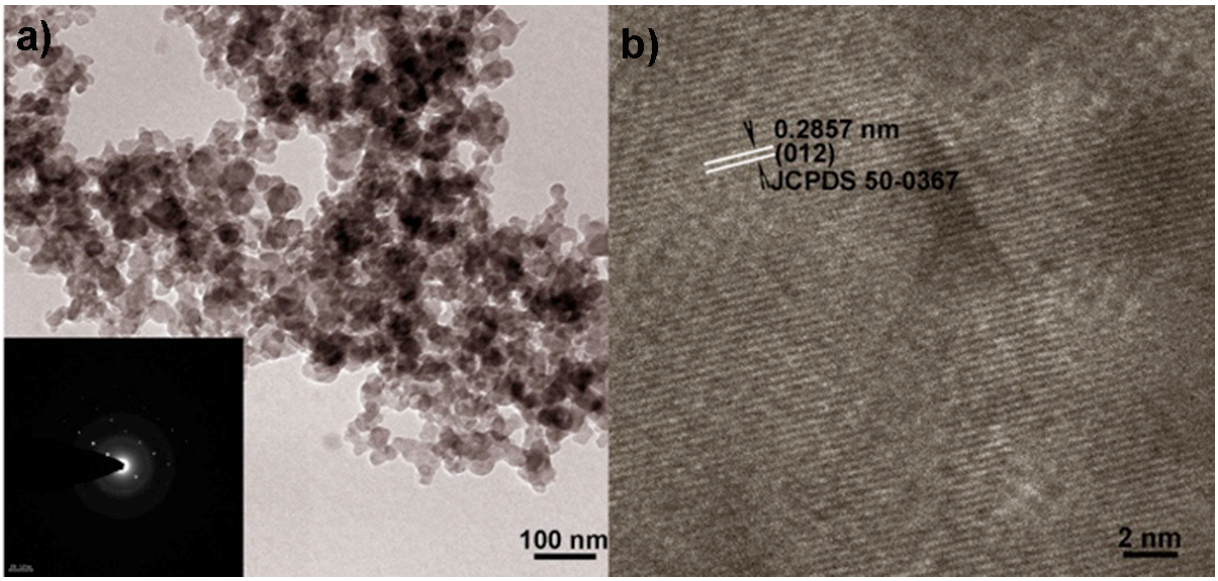


Figure S2. XRD pattern of $LaVO_4$, synthesized in the absence of catechin hydrate: a) without addition of dopant (b) employing Gd^{3+} as dopant (Experimental conditions: [T=210^{o}C, t=4h, pH=9).

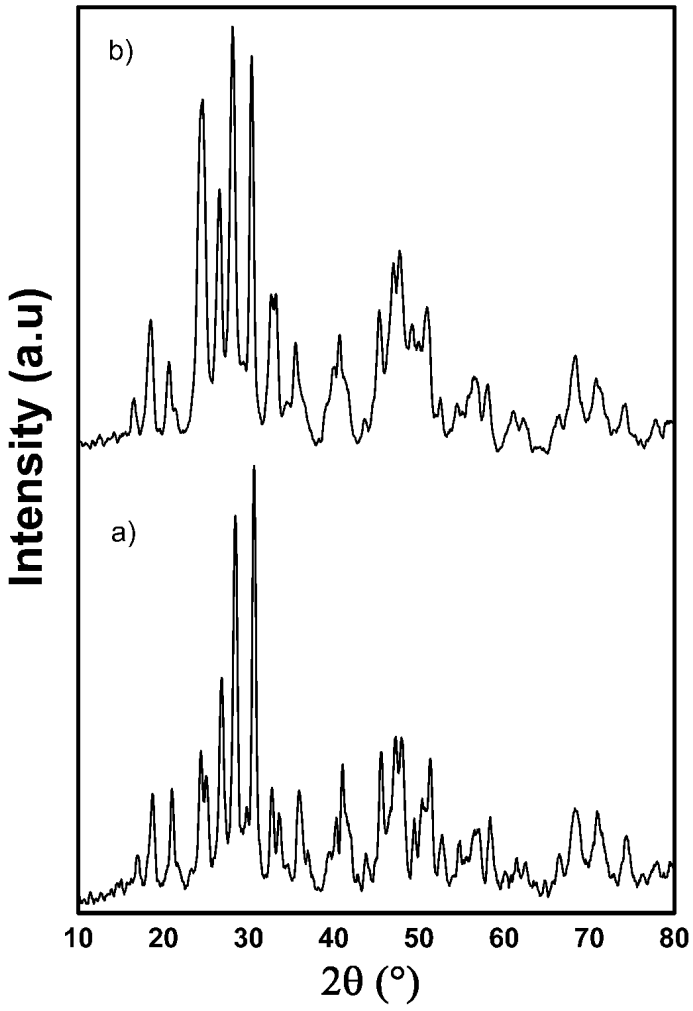


Figure S3. TEM image of Gd^{3+} doped *m*-$LaVO_4$ nanoparticles [Experimental conditions: T=210^{o}C, t=4h, pH=9].

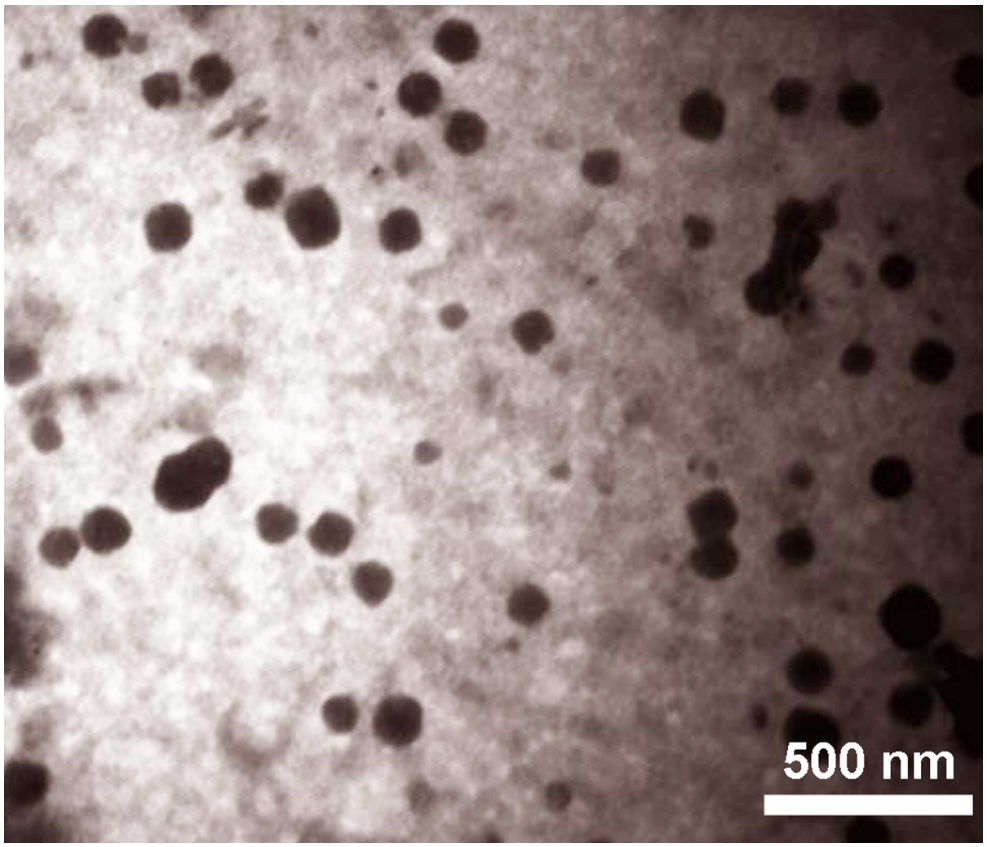


Figure S4. XRD patterns of evolution for *t*-$LaVO_4$ nanoparticles with $[cat^{4-}]/[La^{3+}] = 1/20$ for 24 h at (a) 80°C, (b) 120°C, (c) 150°C, (d) 180°C, (e) 210°C, (f) 240°C [pH=9].

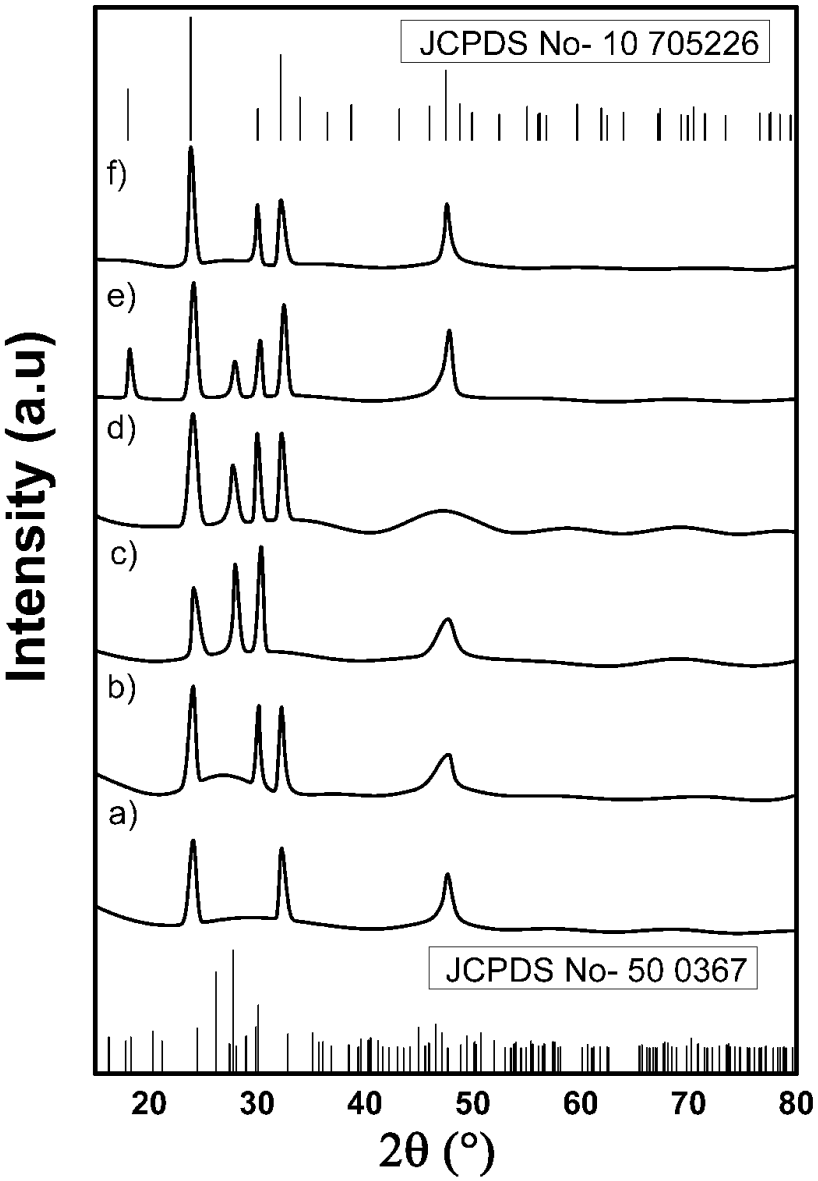


Figure S5. XRD patterns of evolution for *t*-$LaVO_4$ nanoparticles were $[cat^{4-}]/[La^{3+}]$ = 1/20 for (a) room temperature and at 210°C for (b) 30min, (c) 1 h, (d) 2 h, (e) 4 h, (f) 5 h [pH=9].

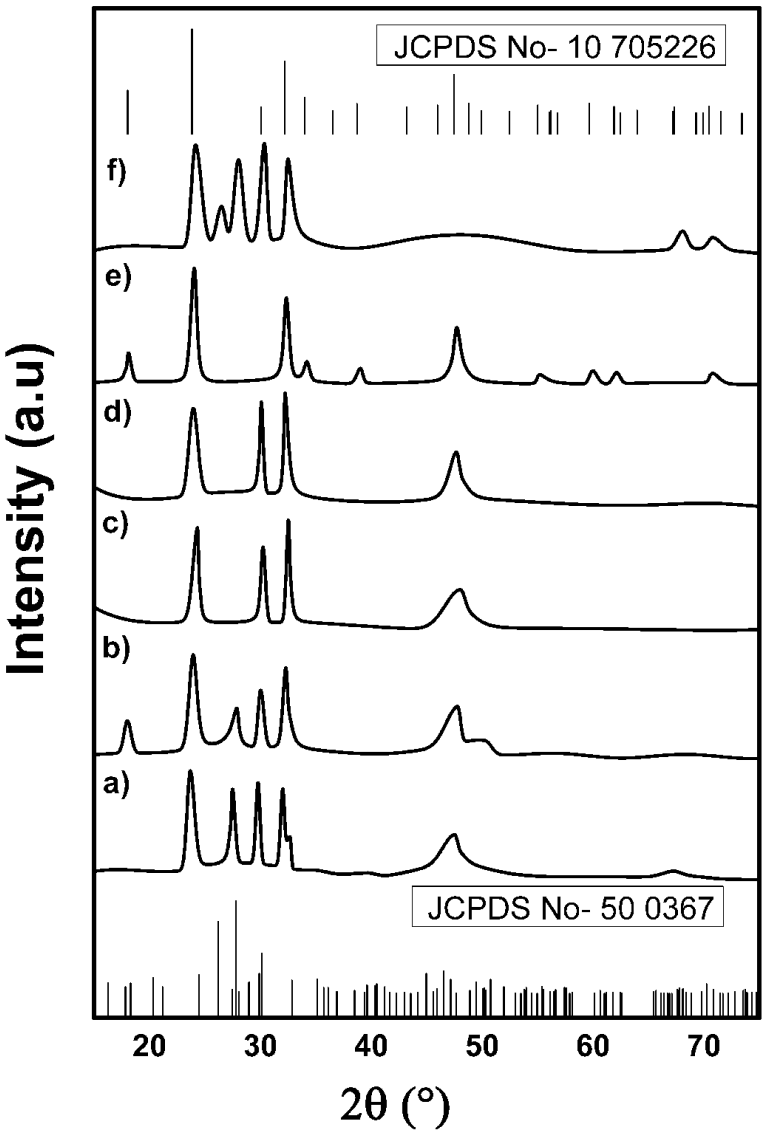


Figure S6. EDAX spectra and composition of Gd^{3+} doped $LaVO_4$ nanoparticles (Experimental conditions: $[cat^{4-}]/[La^{3+}]$ = 1/20,T=210°C, t=4h, pH=7).

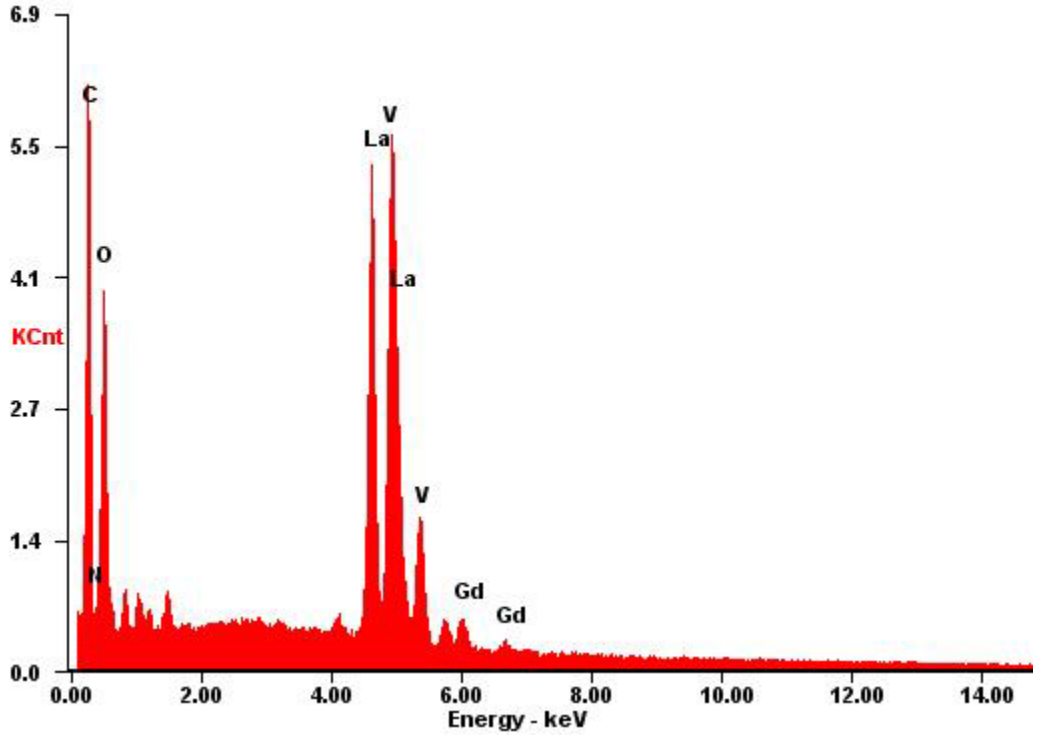
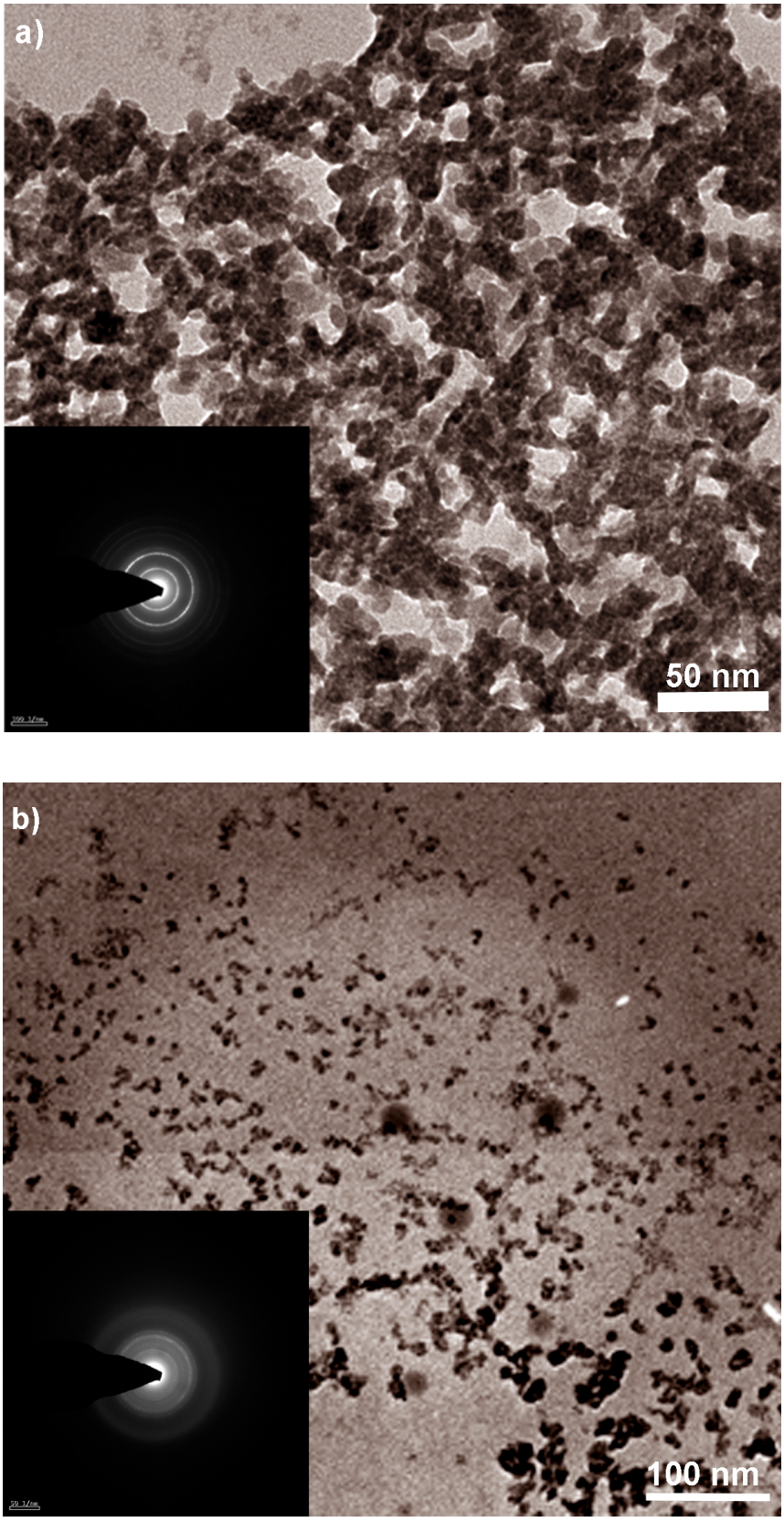
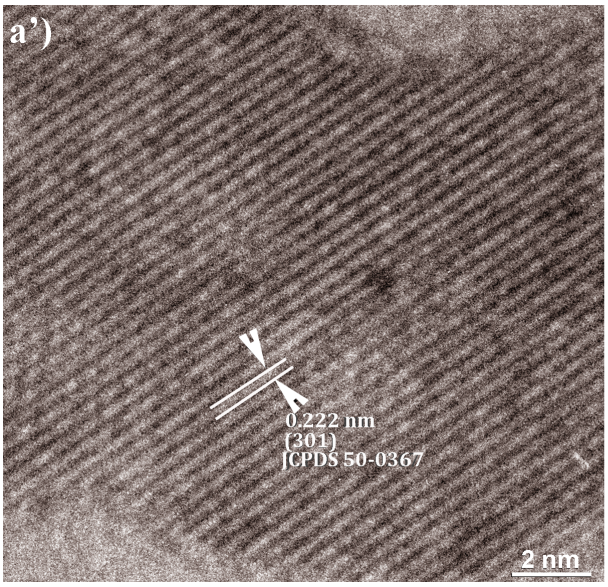
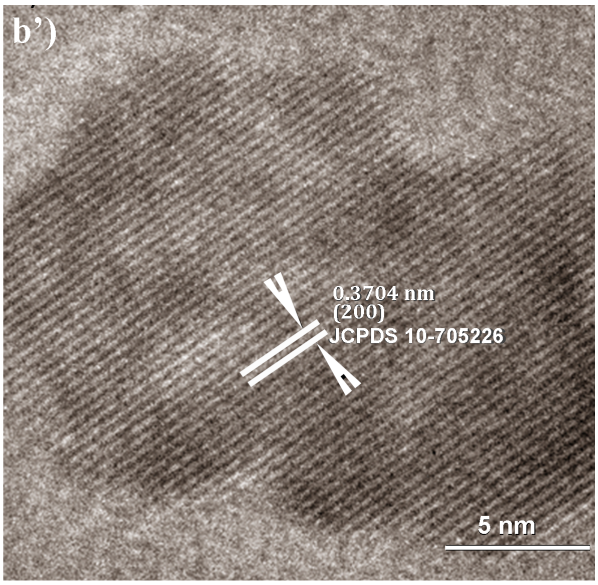


Figure S7. TEM image along with SAED pattern (inset) for a) pH 9.0 and b) pH 13.0. Corresponding HRTEM images are presented as a' and b'. At pH 13.0 a mixture of phases has been observed as indicated in b" (Experimental conditions: $[cat^{4-}]/[La^{3+}]$ = 1/20, T=210°C, t=4h).







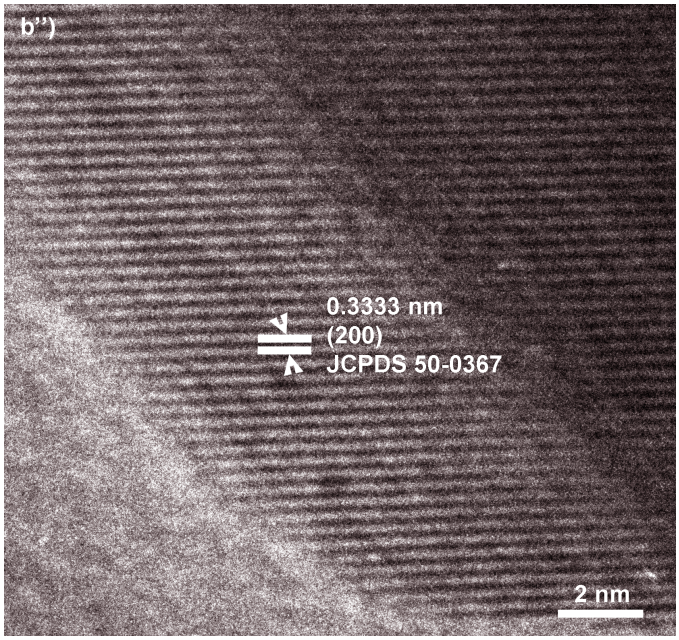
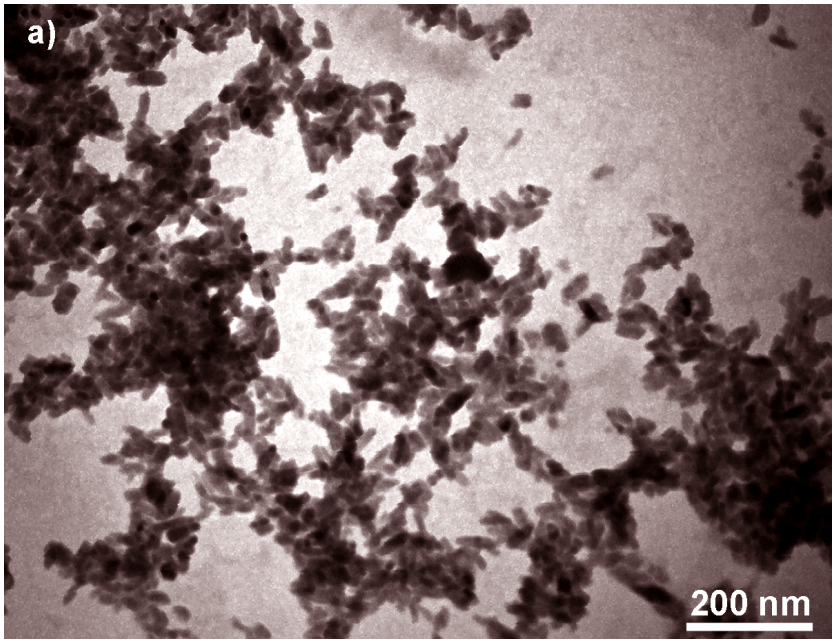


Figure S8. TEM images of Gd^{3+} doped $LaVO_4$ nanoparticles synthesized at a) pH 9.0; b) pH 13.0 (Experimental conditions: $[cat^{4-}]/[La^{3+}]$ =1/20, T=210°C, t=4h).



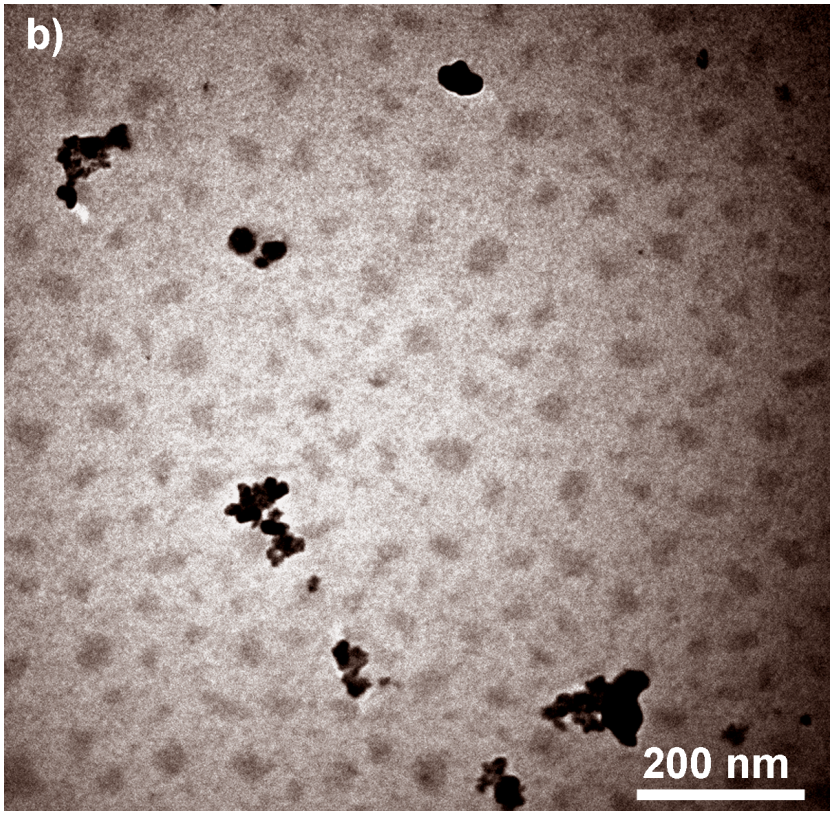


Figure S9. Size distribution by intensity plot for $LaVO_4$ nanoparticles in the presence (green line) and absence (black line) of catechin hydrate (Experimental conditions: T=210^oC, t=4h).

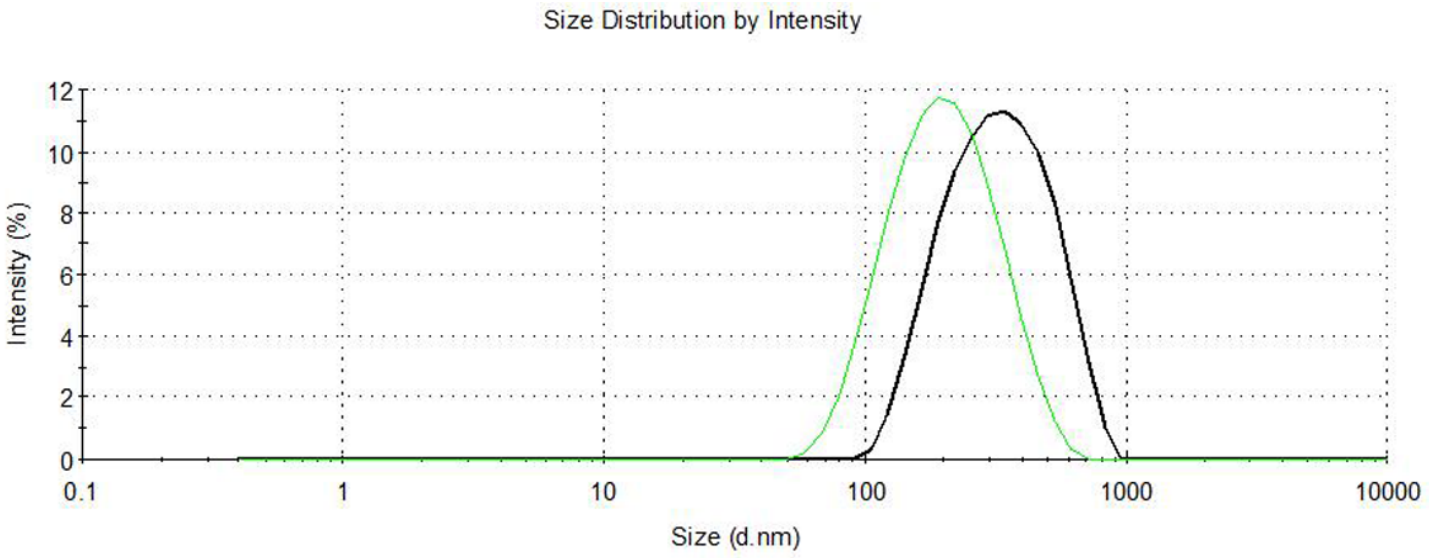


Figure S10**.** FT- IR spectra of 1) catechin hydrate and as – obtained 2) monoclinic 3) tetragonal $LaVO_4$ nanoparticles (Experimental conditions: T=210^oC, t=4h).

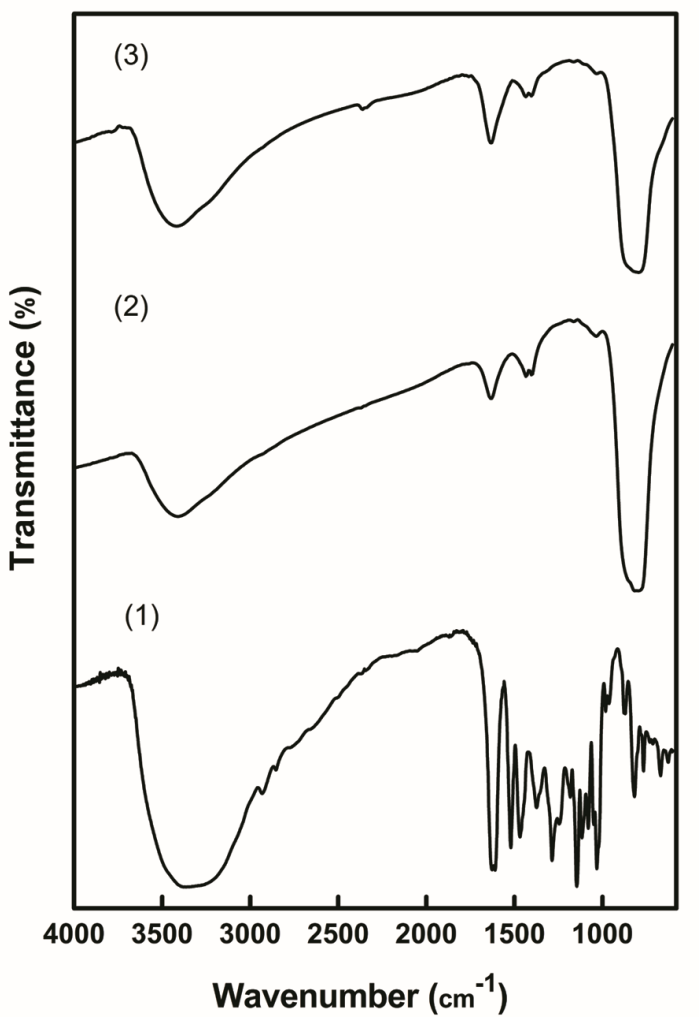


Figure S11. Zeta potential as a function of pH for $LaVO_4$ nanoparticles. The red line represents *t*-$LaVO_4$ and blue line *m*-$LaVO_4$ (Experimental conditions: T=210°C, t=4h). The corresponding isoelectric point is marked as green for *t*-$LaVO_4$ and black for *m*-$LaVO_4$

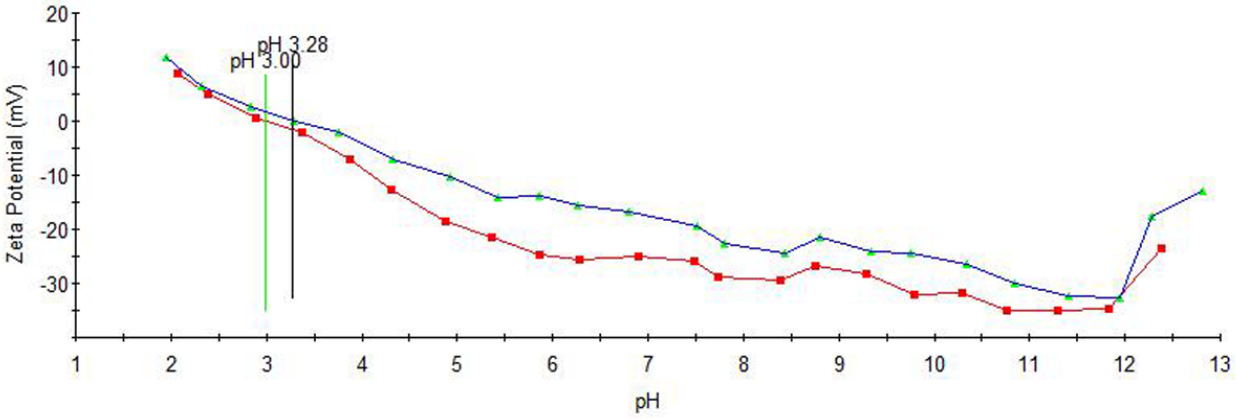
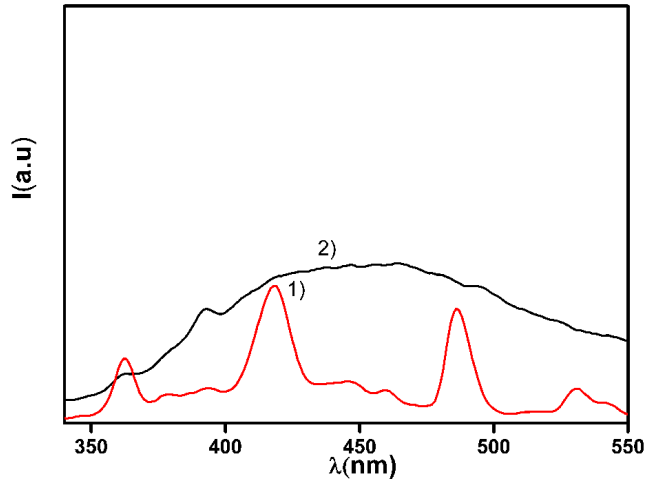
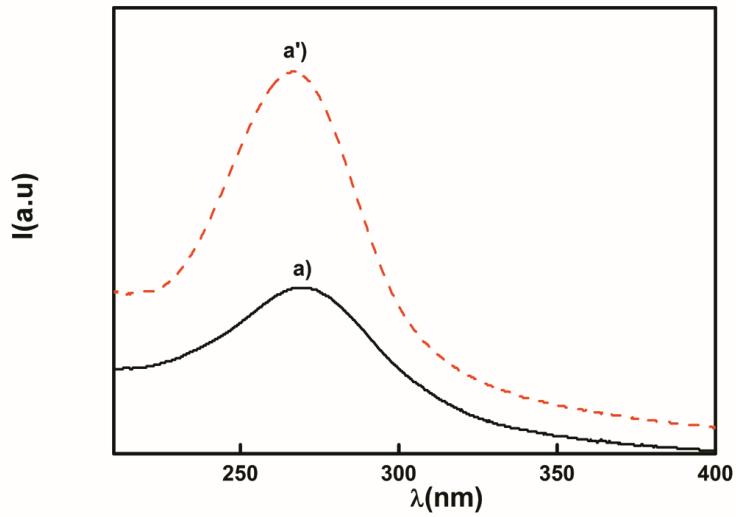


Figure S12. Fluorescence spectra of *t*- $LaVO_4$: Gd^{3+} nanoparticles for corresponding absorbance value of 1) > 4 2) <1. (Experimental conditions: $[cat^{4-}]/[La^{3+}]$ = 1/20,T=210°C, t=4h, pH=7). Absorption and Excitation spectra of monoclinic and tetragonal LaVO4: Gd^{3+} nanoparticles are presented as a, a' and b, b' respectively.





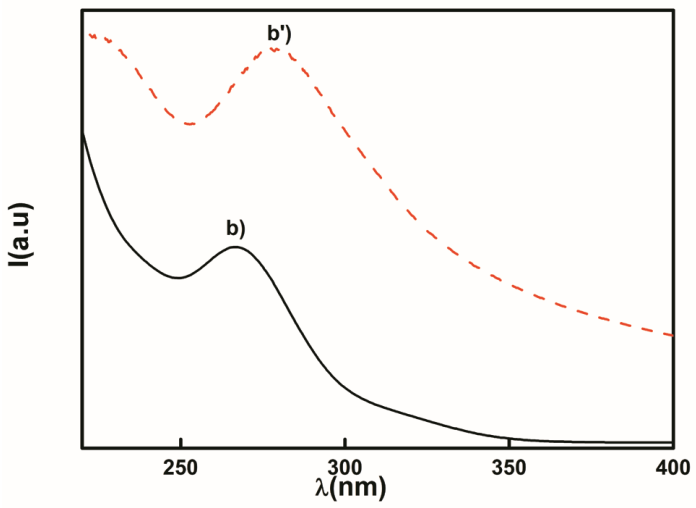


Figure S13. Magnetization curves recorded at room temperature for 1) *t*- 2) *m*- Gd^{3+} doped $LaVO_4$ nanoparticles [Experimental conditions: 1) $[cat^{4-}]/[La^{3+}]$ = 1/20,T=210°C, t=4h, pH=7; 2) $[cat^{4-}]/[La^{3+}]$ = 0,T=210°C, t=4h, pH=8].