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°C, t=4h, pH=9].
Figure S2. XRD pattern of LaVO₄, synthesized in the absence of catechin hydrate: a) without addition of dopant (b) employing Gd³⁺ as dopant (Experimental conditions: [T=210°C, t=4h, pH=9]).
Figure S3. TEM image of Gd$^{3+}$ doped $m$-LaVO$_4$ nanoparticles [Experimental conditions: T=210°C, t=4h, pH=9].
Figure S4. XRD patterns of evolution for $t$-LaVO$_4$ nanoparticles with [cat$^{+}$/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 \([\text{cat}^4]/[\text{La}^{3+}] = 1/20\) 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$^+$]/[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: $\left[\text{cat}^+\right]/\left[\text{La}^{3+}\right] = 1/20$, $T=210^\circ\text{C}$, $t=4\text{h}$).
**Figure S8.** TEM images of Gd$^{3+}$ doped LaVO$_4$ nanoparticles synthesized at a) pH 9.0; b) pH 13.0 (Experimental conditions: [cat$^-$]/[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: $T=210^\circ$C, $t=4$h).
Figure S10. FT-IR spectra of 1) catechin hydrate and as-obtained 2) monoclinic 3) tetragonal LaVO$_4$ nanoparticles (Experimental conditions: T=210°C, 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$^\circ$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$^+$]/[La$^{3+}$] = 1/20, T=210°C, t=4h, pH=7). Absorption and Excitation spectra of monoclinic and tetragonal LaVO$_4$: 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].