SUPPORTING INFORMATION

Sequential incorporation of metallic cations (Cd^{2+} and Hg^{2+}) and N-Octylamine into Titanium Phosphate Nanoparticles and their subsequent release in acid media

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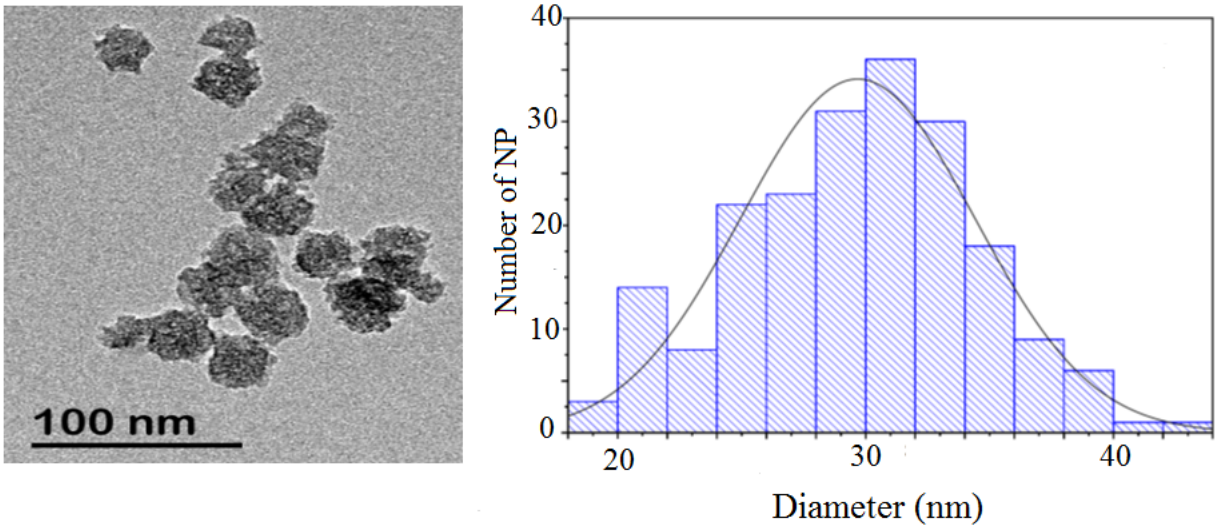

Figure S-1 TEM Micrographs (left) and Size distribution (right) of TPNP.

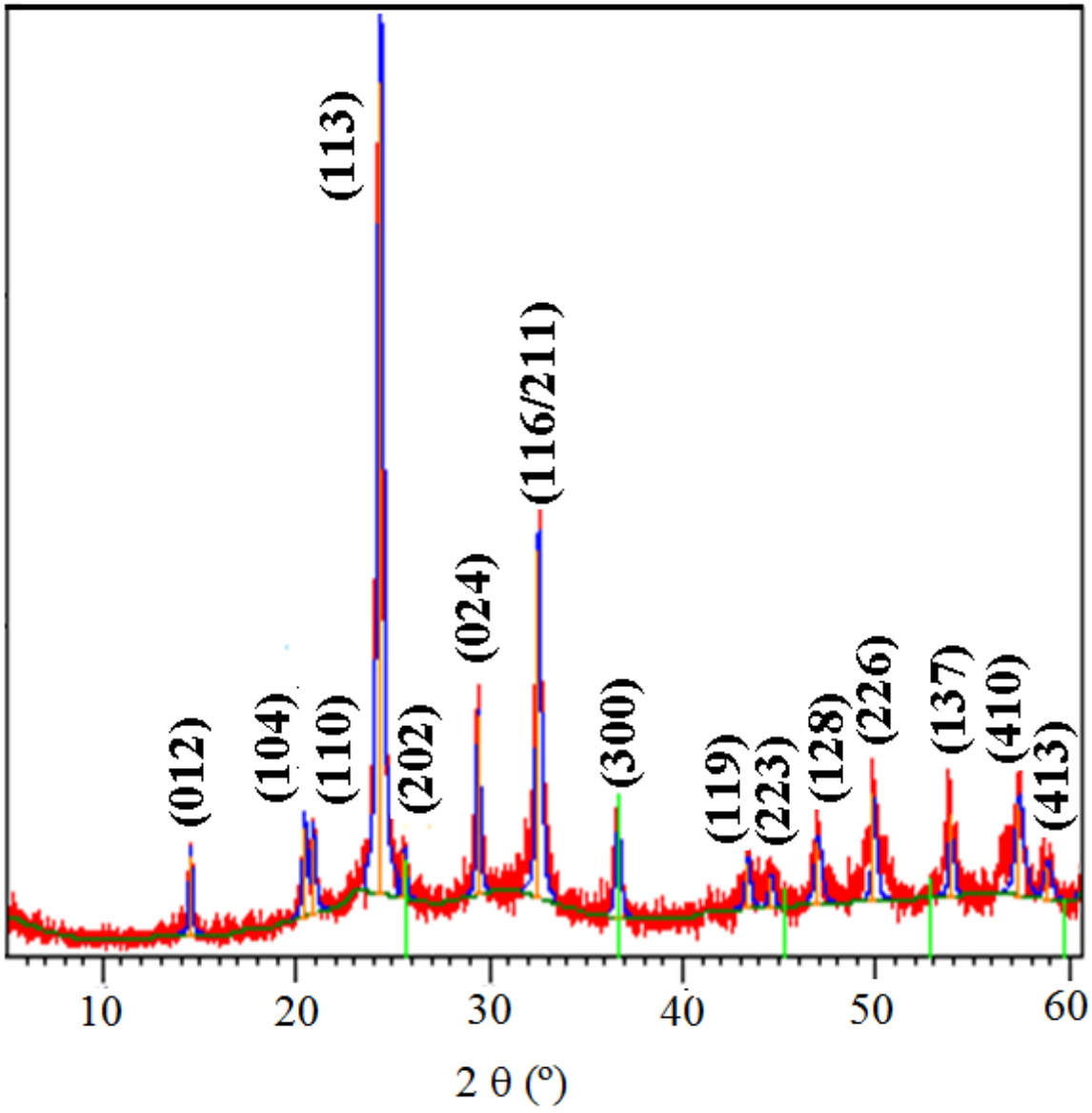

Figure S-2 XRD pattern of TPNP.

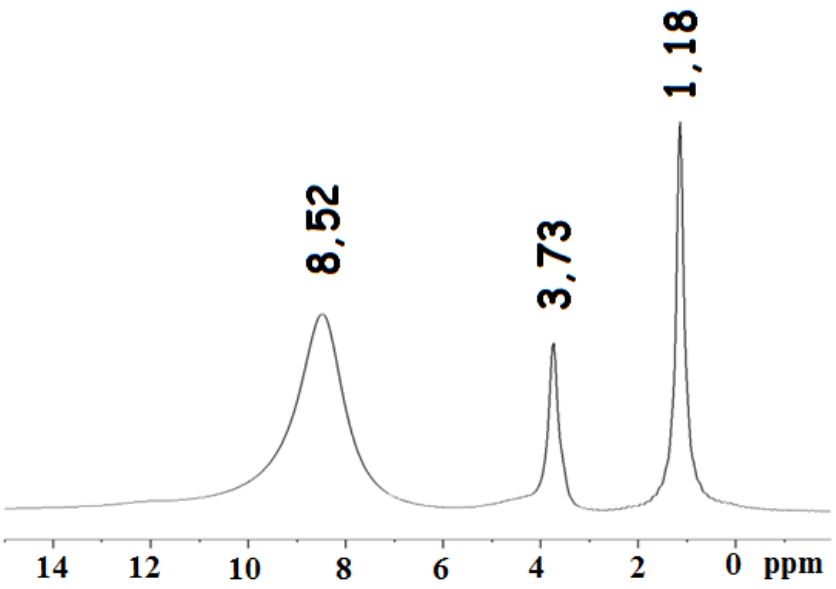

Figure S-3 ^{1}H MAS NMR of TPNP.

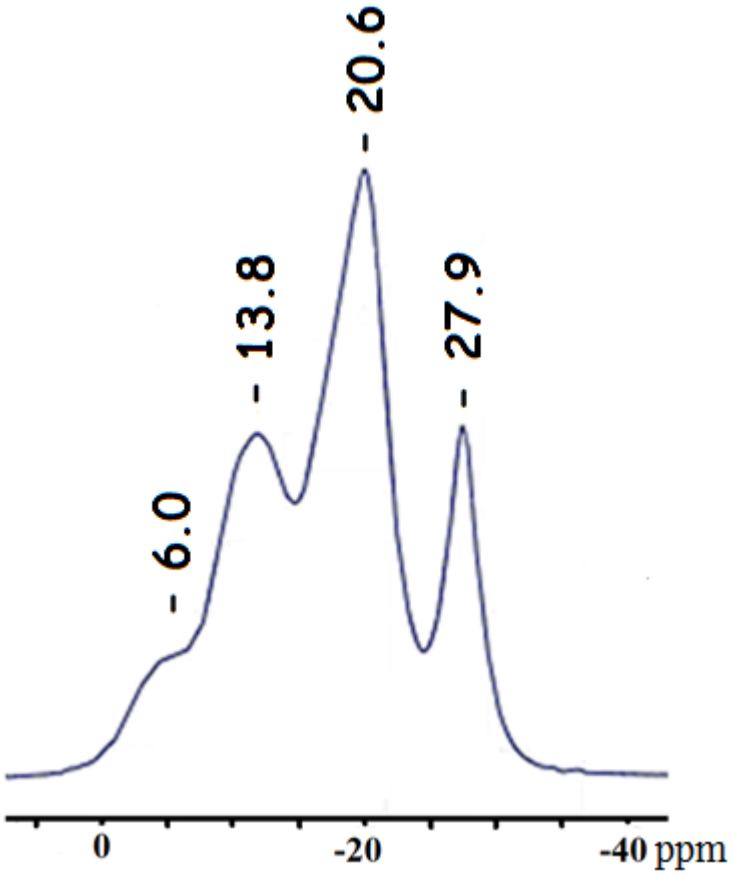

Figure S-4 ^{31}P CP/MAS NMR spectrum of TPNP.

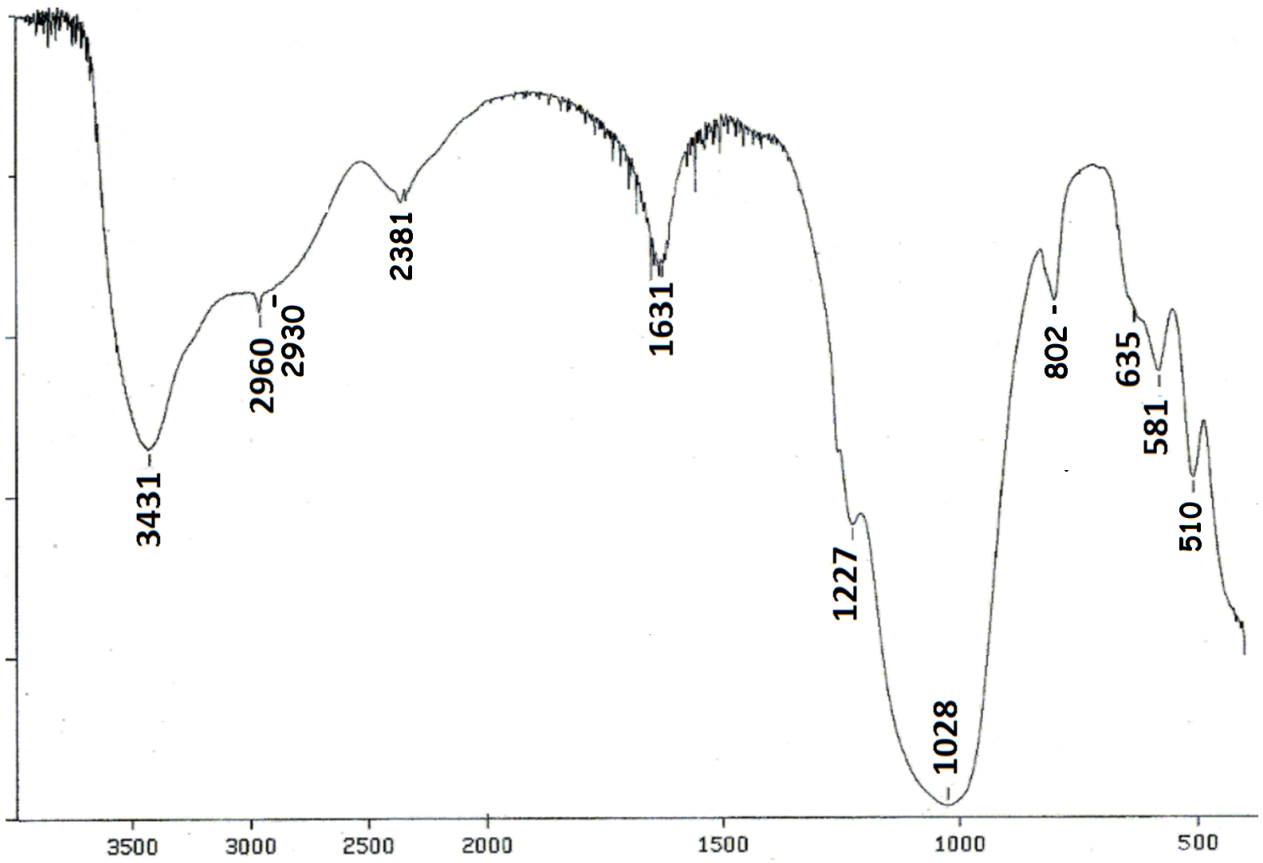

Figure S-5 Infrared spectrum of TPNP (4000-400 cm^{-1}).

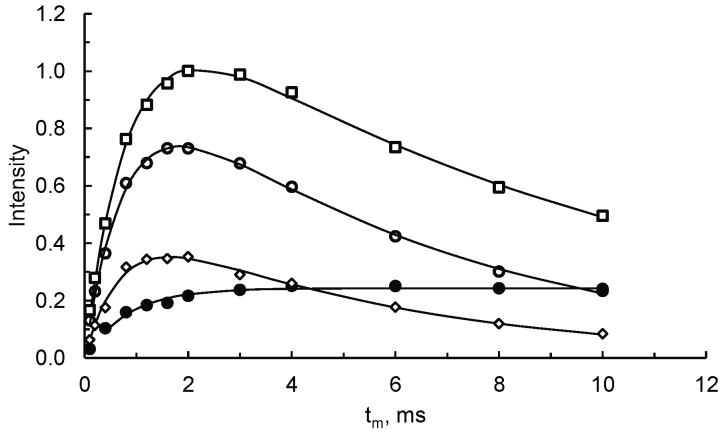

Figure S-6. $^{1}H \rightarrow {}^{31}P$ CP kinetics with MAS at 6 kHz in TPNP: (●) -27.9 ppm; (□) -20.6 ppm; (○) -13.8 ppm, and (◊) -6.0 ppm. The fittings use eq. $I(t) = I_0\,(1 - \frac{T_{IS}}{T_{1\rho}^{I}})^{-1}\left[\exp\left(-\frac{t_m}{T_{1\rho}^{I}}\right) - \exp\left(-\frac{t_m}{T_{IS}}\right)\right]$ where *I(t)* represents the peak intensity, I_0 is the absolute intensity, T_{IS} is the CP time constant between nuclei *I* (^{1}H) and *S* (^{31}P), $T_{1\rho}^{I}$ is the spin-lattice relaxation time in the rotating frame of nuclei *I* and t_m is the contact time.

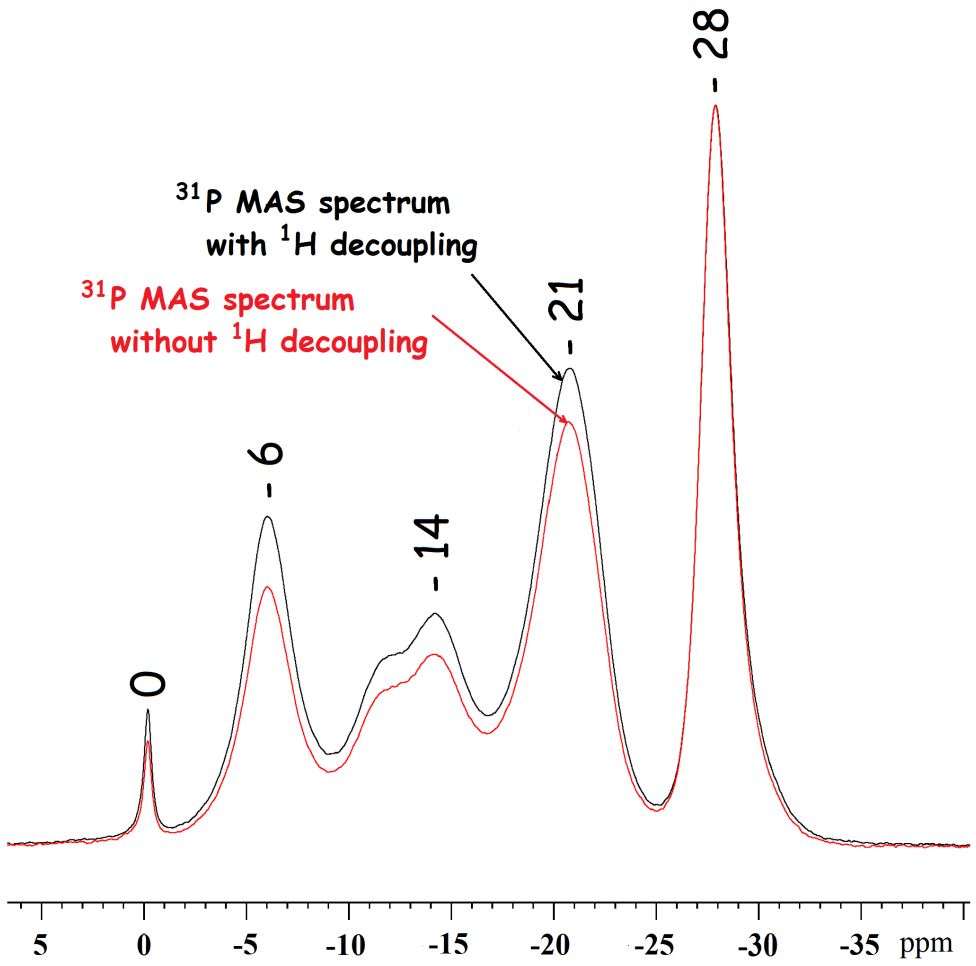

Figure S-7 ^{31}P MAS NMR spectra of TPNP, one with ^{1}H decoupling (black), the other without ^{1}H decoupling (red).

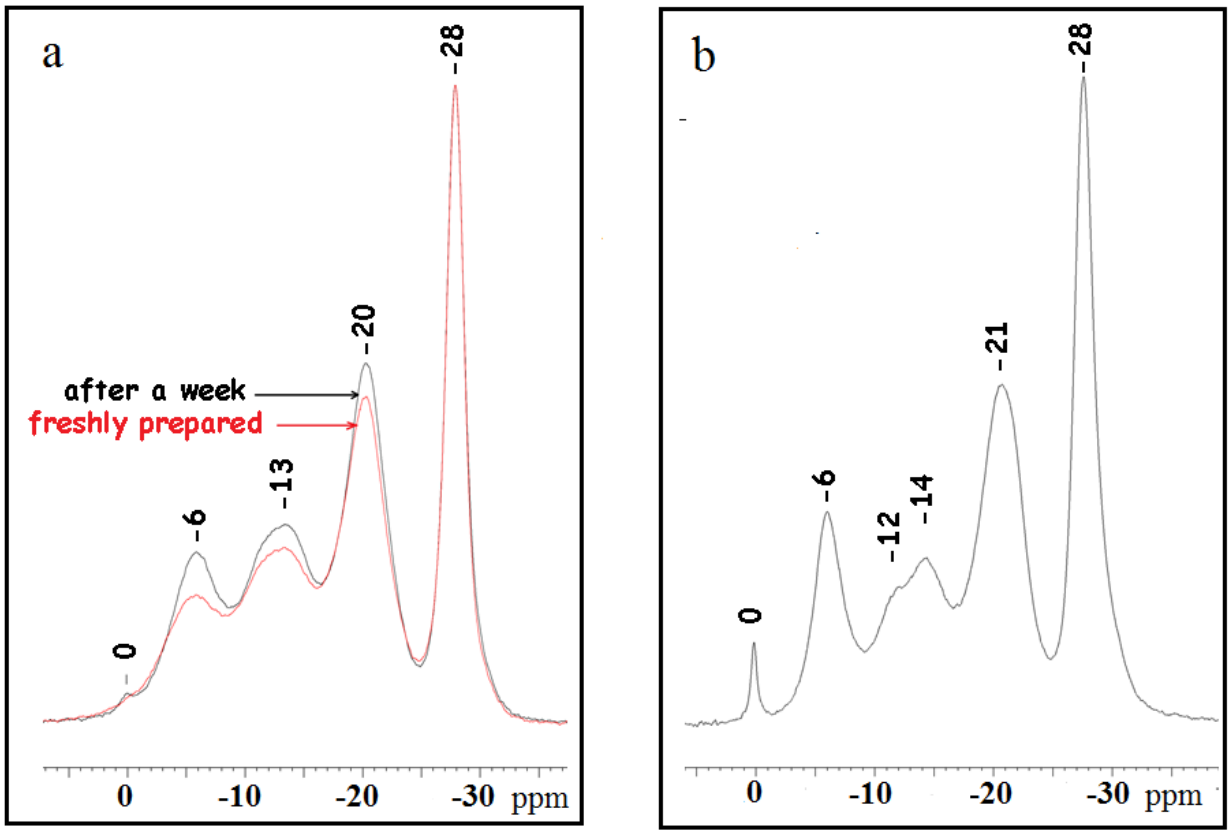

Figure S-8 ^{31}P MAS NMR spectrum of TPNP freshly prepared (red) and after a week (black) (a) and after four months (b).

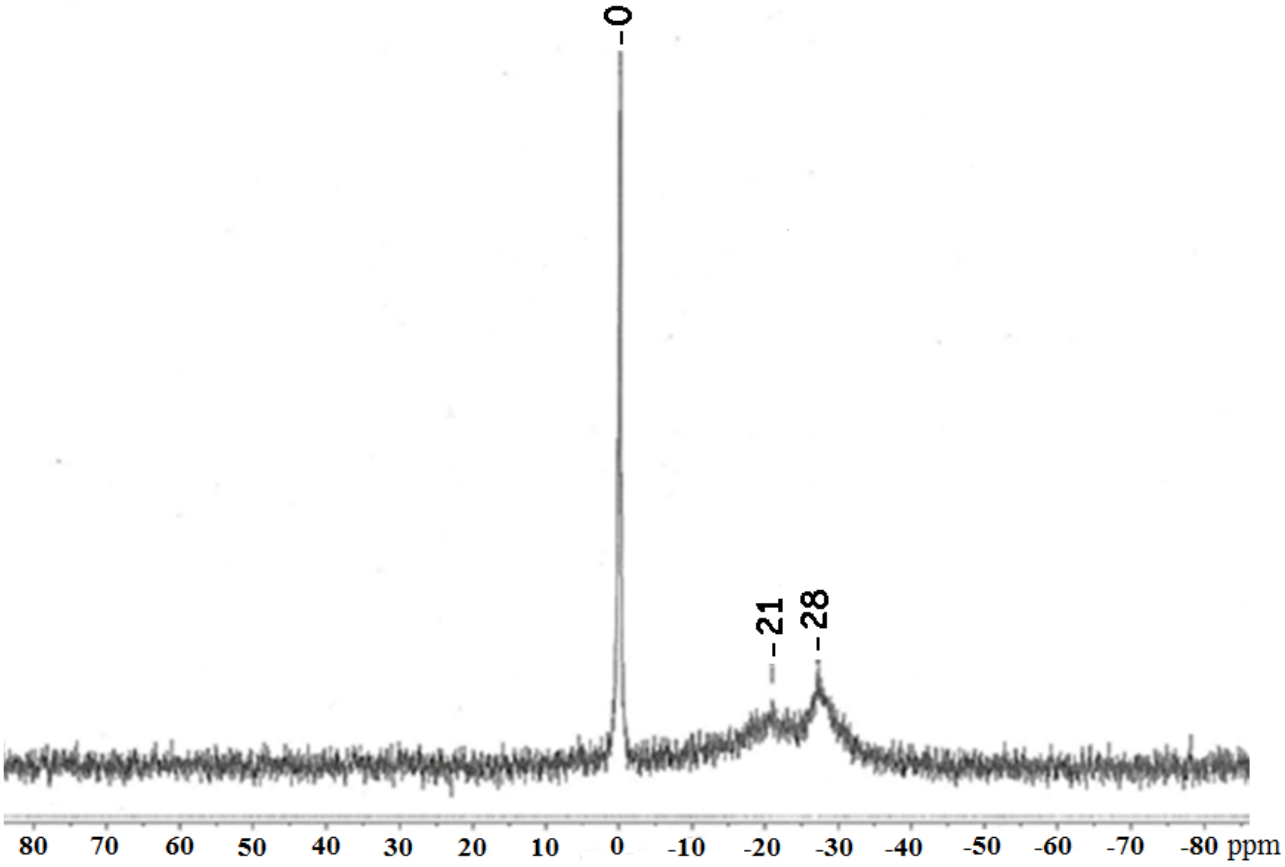

Figure S-9 ^{31}P NMR spectrum of TPNP in D_2O after stirring at room temperature the nanoparticles in deuterated water for 10 minutes.

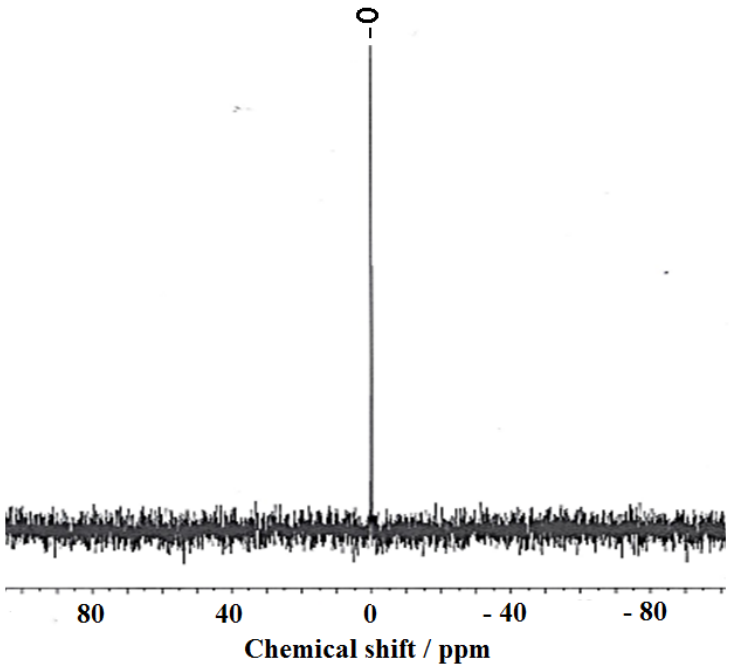

Figure S-10 ^{31}P NMR spectrum of the final mixture solution after the reaction between TPNP (40 mg) and $Cd(NO_3)_2$ (0.17 mmol) at 50ºC for 2h. Initially, the titanium phosphate nanoparticles were added to the cadmium salt solution.

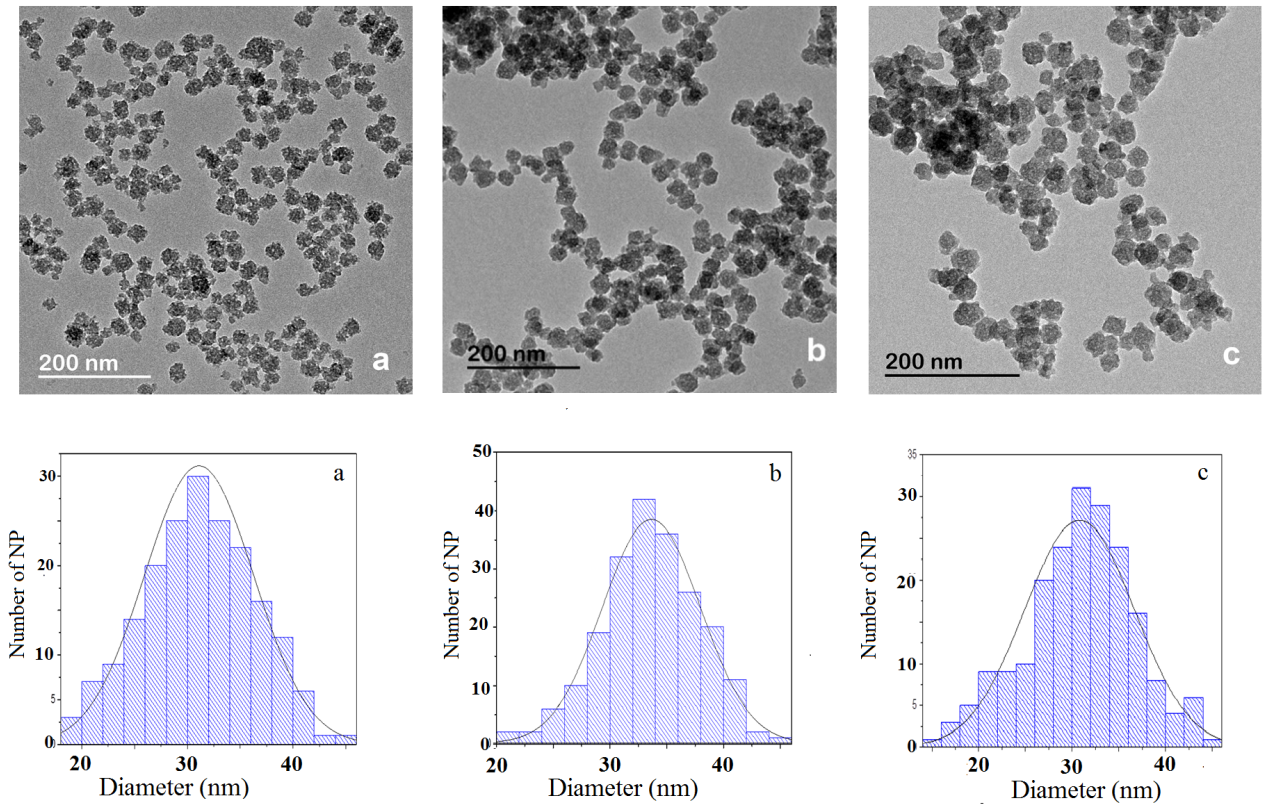

Figure S-11 TEM Micrographs (top) and Size distribution (bottom) of TPNP-Cd-1(a), TPNP-Cd-2 (b) and TPNP-Cd-3 (c).

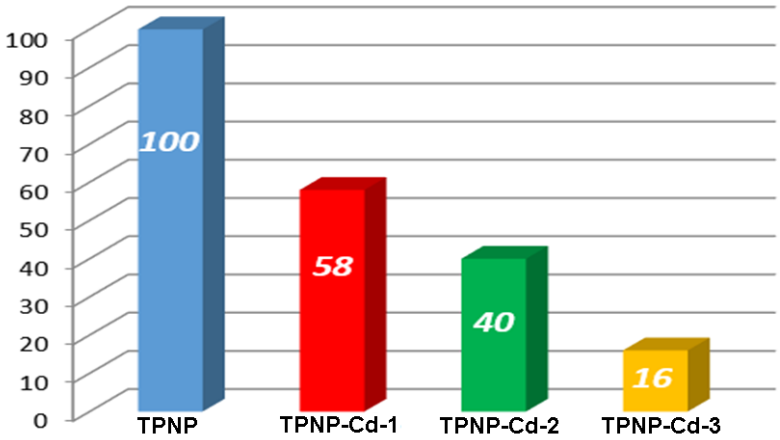

Figure S-12 Relative area under the fluorescence signal at 720 nm corresponding to TPNP, TPNP-Cd-1, TPNP-Cd-2 and TPNP-Cd-3.

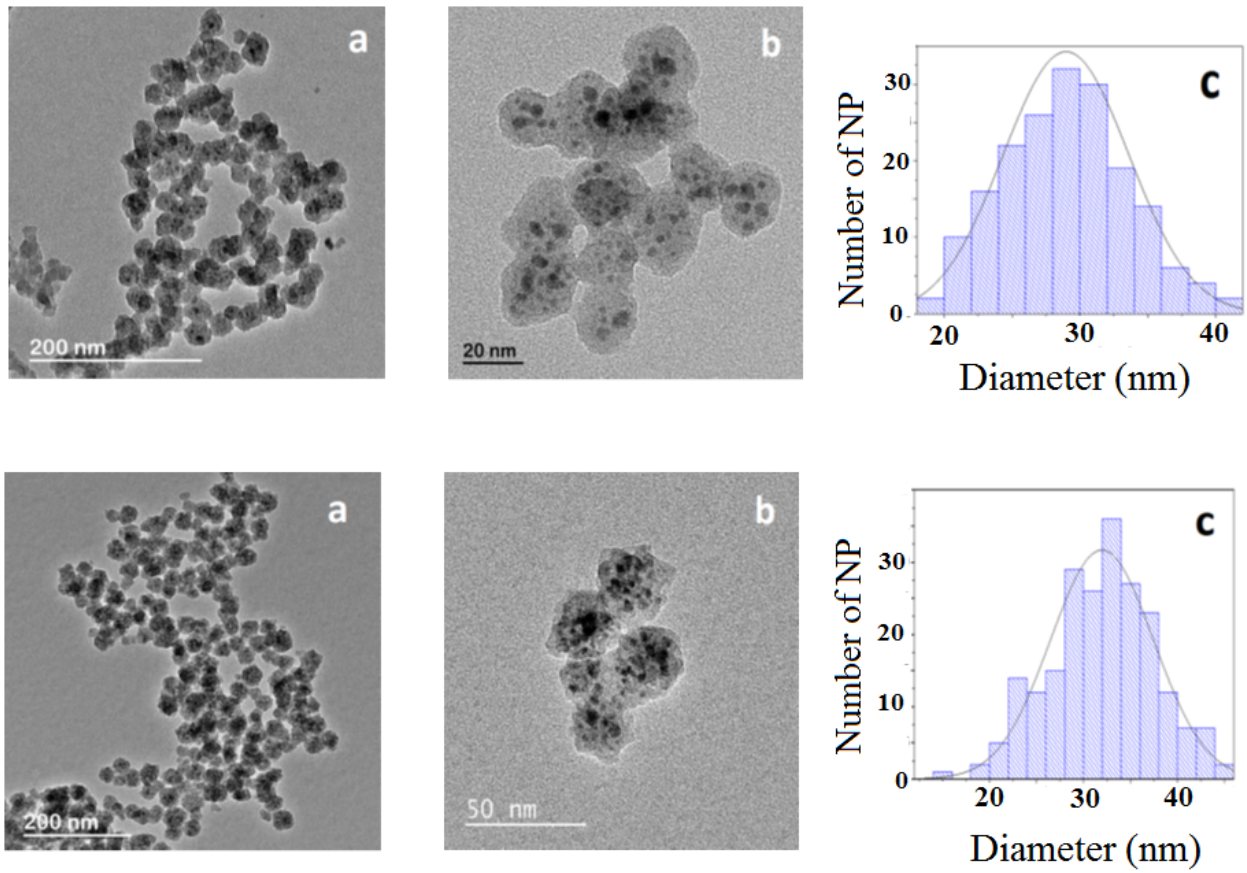

Figure S-13 Overview (a) and detailed (b) TEM Micrographs and Size distribution (c) of TPNP-Hg-1 (top) and TPNP-Hg-2 (bottom).

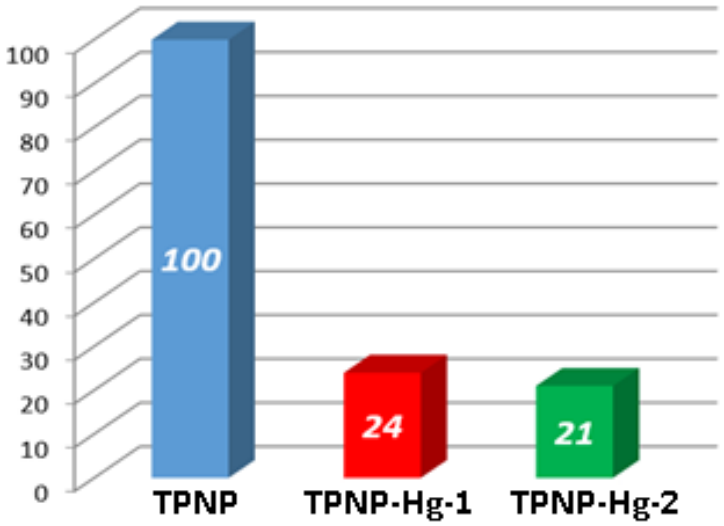

Figure S-14 Relative area under the fluorescence signal at 720 nm corresponding to TPNP, TPNP-Hg-1 and TPNP-Hg-2.

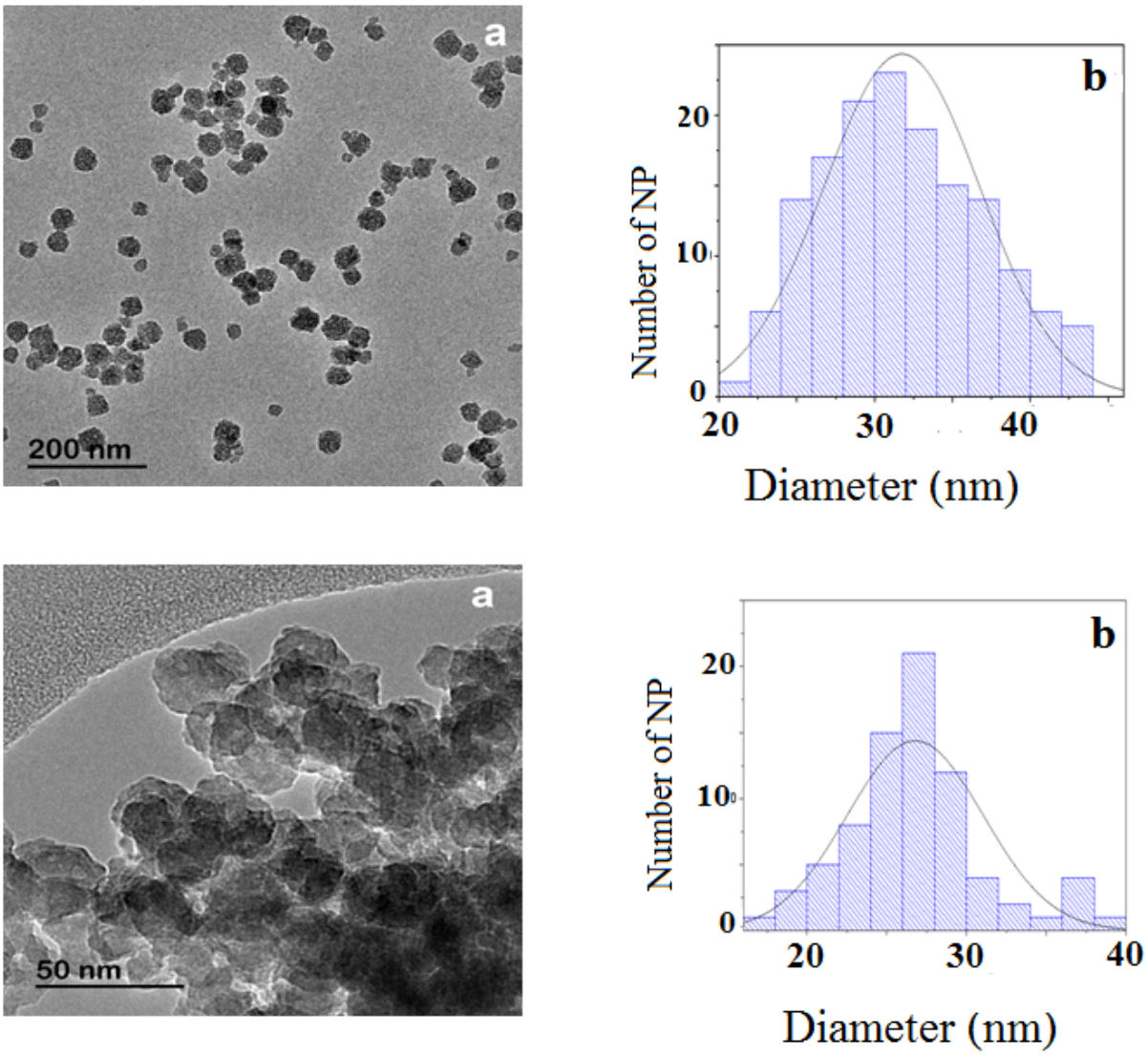

Figure S-15 TEM Micrographs (a) Size distribution (b) of TPNP-Cd-2-H (top) and TPNP-Hg-2-H (bottom).

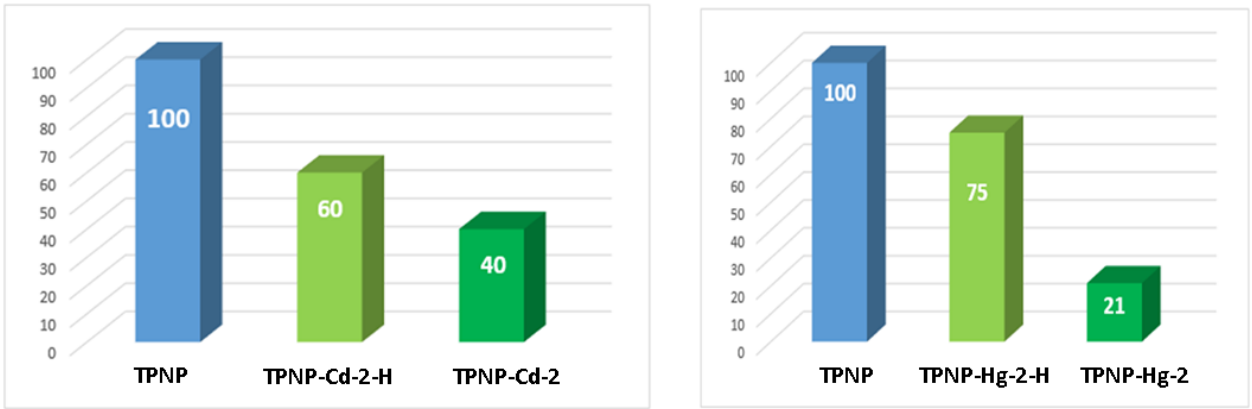

Figure S-16 Relative area under the fluorescence signal at 720 nm corresponding to TPNP, TPNP-Cd-2-H and TPNP-Cd-2 (left) and to TPNP, TPNP-Hg-2-H and TPNP-Hg-2 (right).

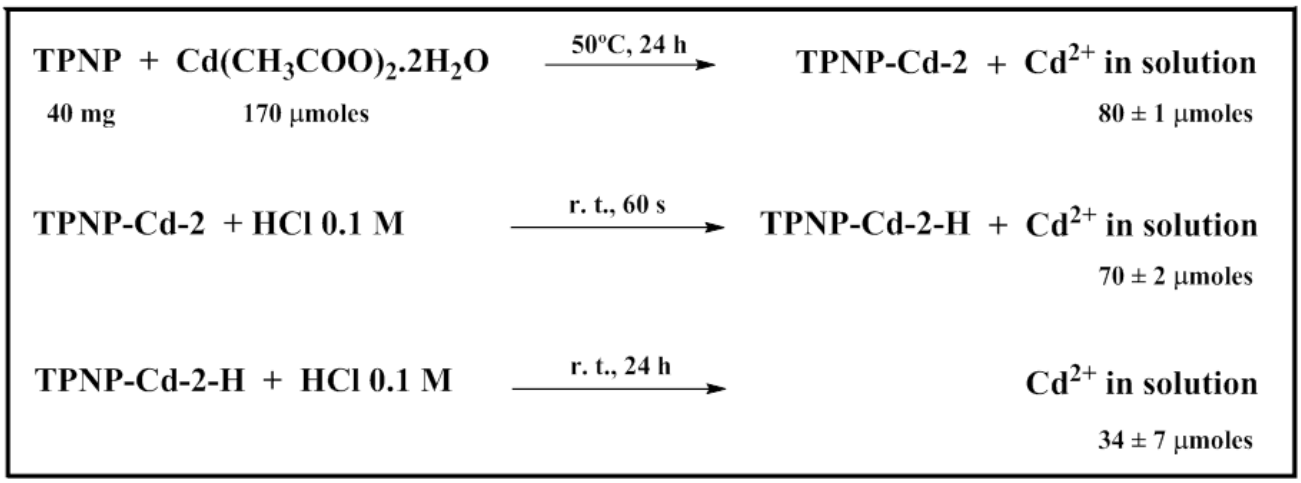

Figure S-17 Monitoring of Cd^{2+} abundance in solution and the incorporation /release of the cadmium (II) cation to/from titanium phosphate nanoparticles.

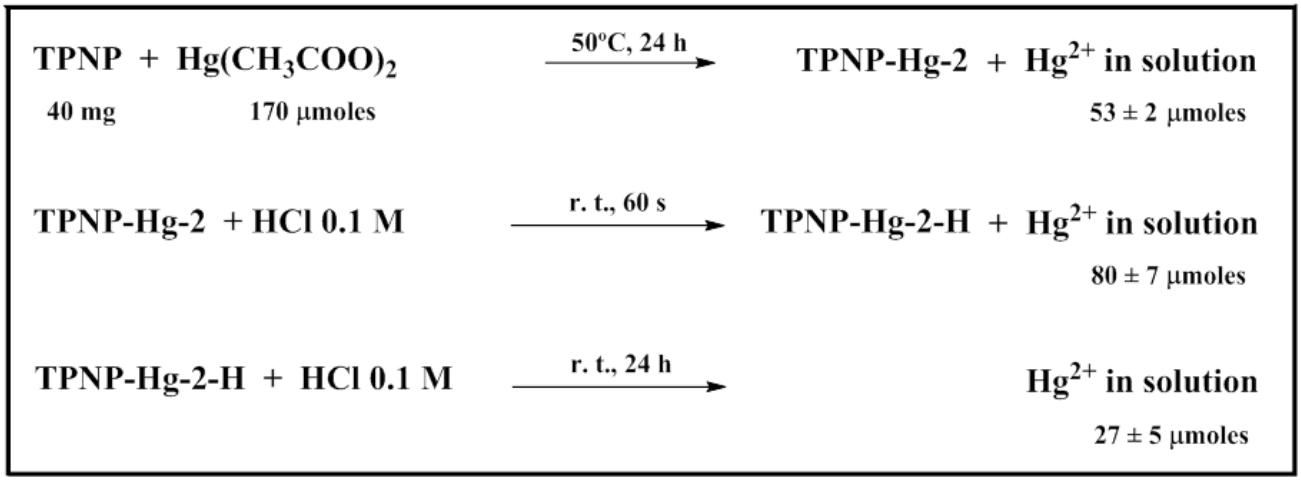

Figure S-18 Monitoring of Hg^{2+} abundance in solution and the incorporation/release of the mercury (II) cation to/from titanium phosphate nanoparticles.

Table S-1. Cross-polarization time constants.

Phosphate group	δ_{iso}, ppm	$T_{1\rho}$ (^{1}H) [a], ms	T_{HP} [a], ms
$(PO_4)^{3-}$	-27.9	∞	0.83 (0.06)
$(HPO_4)^{2-}$	-20.6	9.6 (0.4)	0.83 (0.03)
$(H_2PO^4)^-$	-13.8	6.2 (0.2)	0.78 (0.03)
(NaH_2PO_4)	-6.0	5.2 (0.4)	0.71 (0.06)

[a]Standard deviation shown in parenthesis.