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Fabrication of functional bioinorganic nanoconstructs by polymer-silica wrapping of individual myoglobin molecules

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Supporting Information:

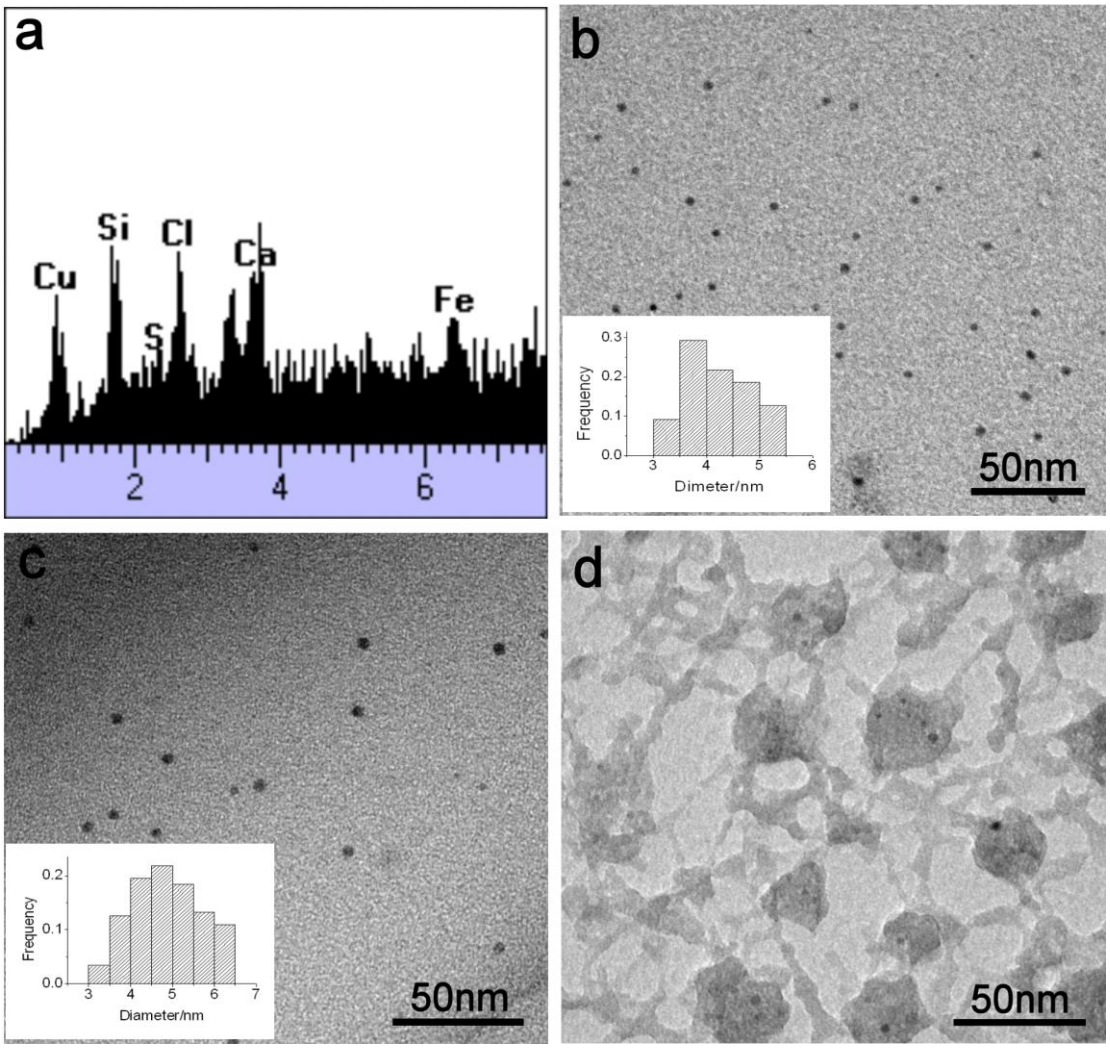

Figure S1 (a) EDX analysis for met-Mb/P123/SiO_2 nanoparticles redispersed in water; (b,c) TEM images and histograms (insets) of met-Mb/P123/SiO_2 nanoparticles prepared in cyclohexane at a molar ratio of (b) Mb : P123 =1 : 50, and (c) Mb : TMOS= 1:90. (d) silica network formed at a Mb : TMOS molar ratio of 1 : 120.

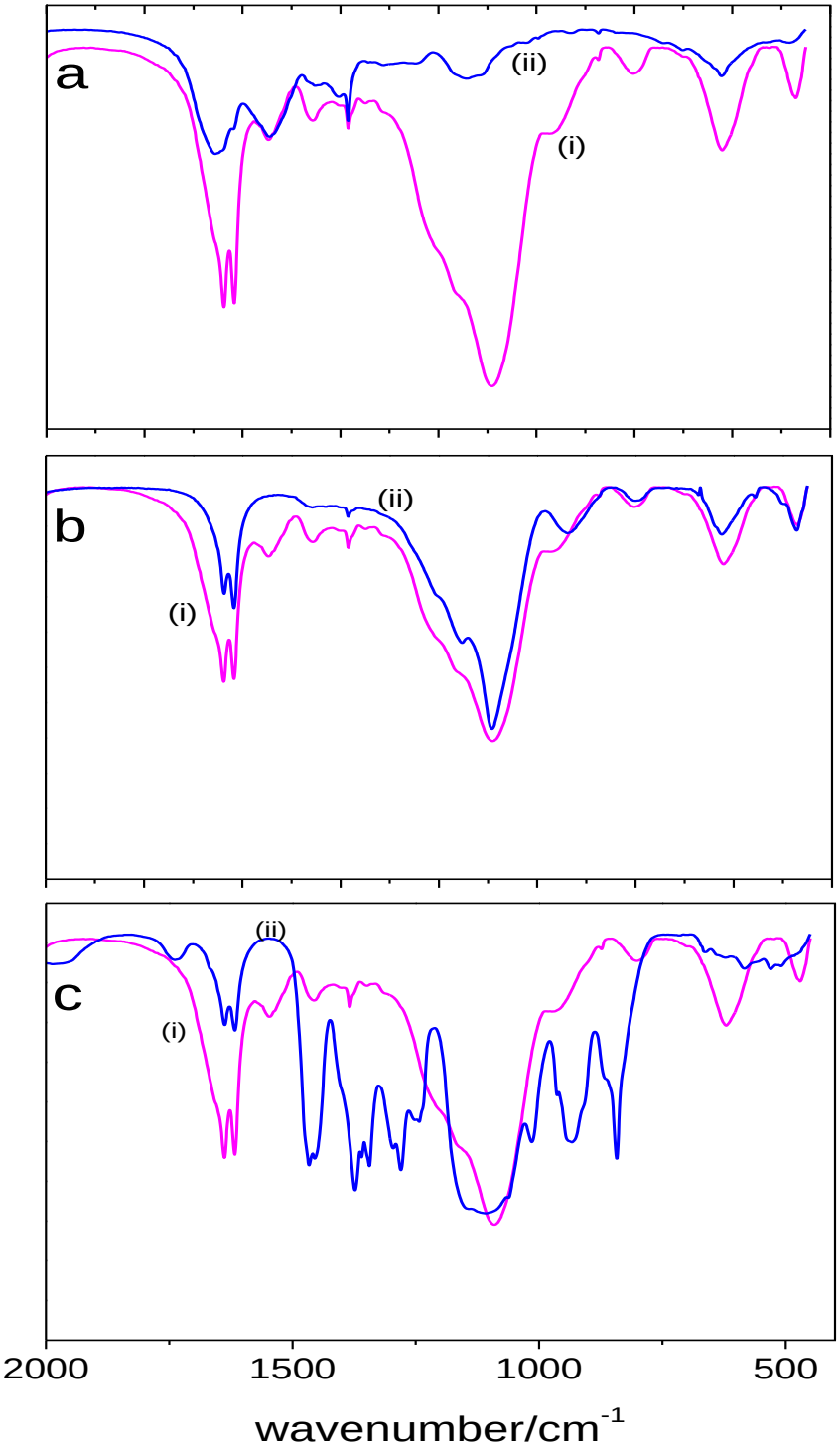

Figure S2a. FTIR spectra of (a) met-Mb/P123/SiO_2 nanoparticles (i) and native met-Mb (ii), (b) met-Mb/P123/SiO_2 nanoparticles (i) and silica (ii), (c) met-Mb/P123/SiO_2 nanoparticles (i) and P123 (ii).

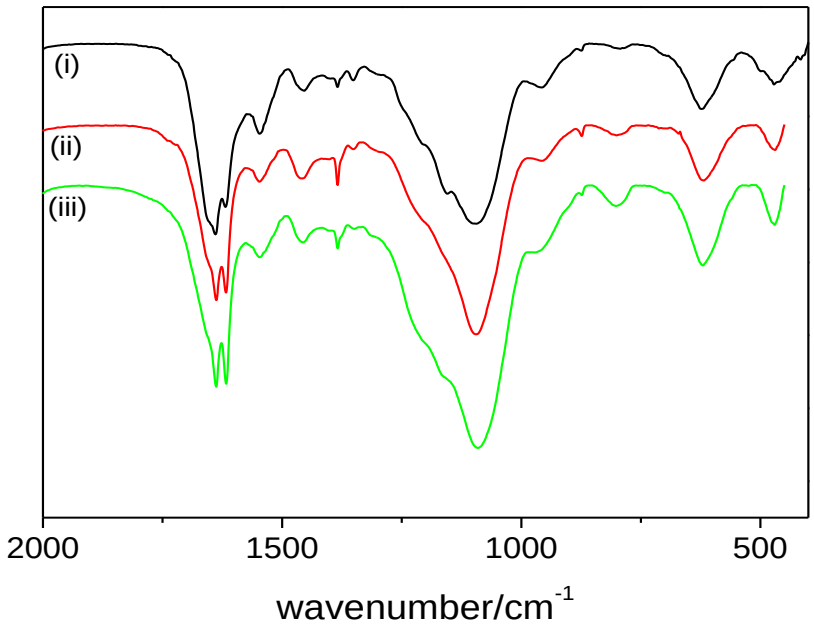

Figure S2b : FTIR spectra of met-Mb/P123/SiO_2 nanoparticles at different molar ratios of Mb : P123 : TMOS; (i) 1:10:15 (ii) 1:20:15 (iii) 1:50:15.

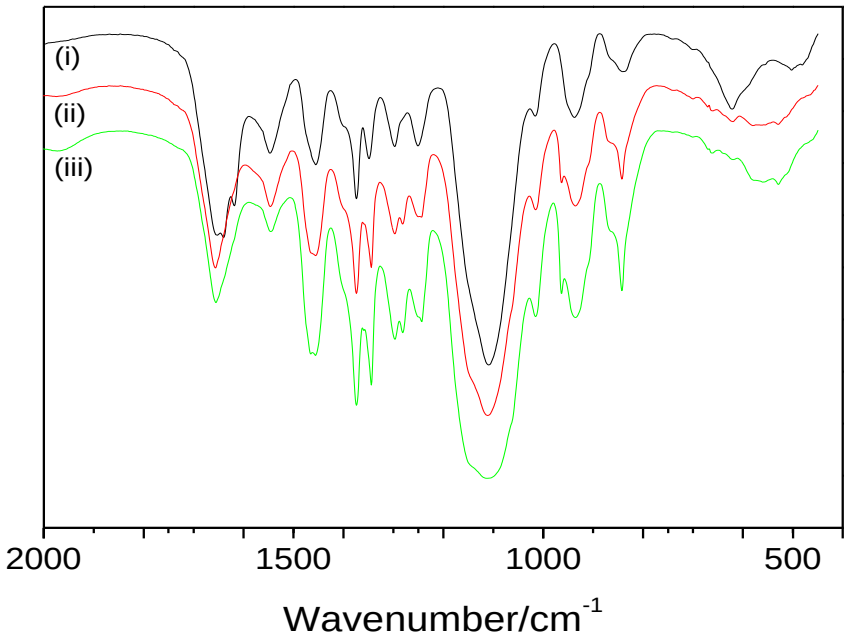

Figure S2c : FTIR spectra of Mb/P123 at different molar ratio of Mb : P123 (i) 1:10 (ii) 1:20 (iii) 1:50.

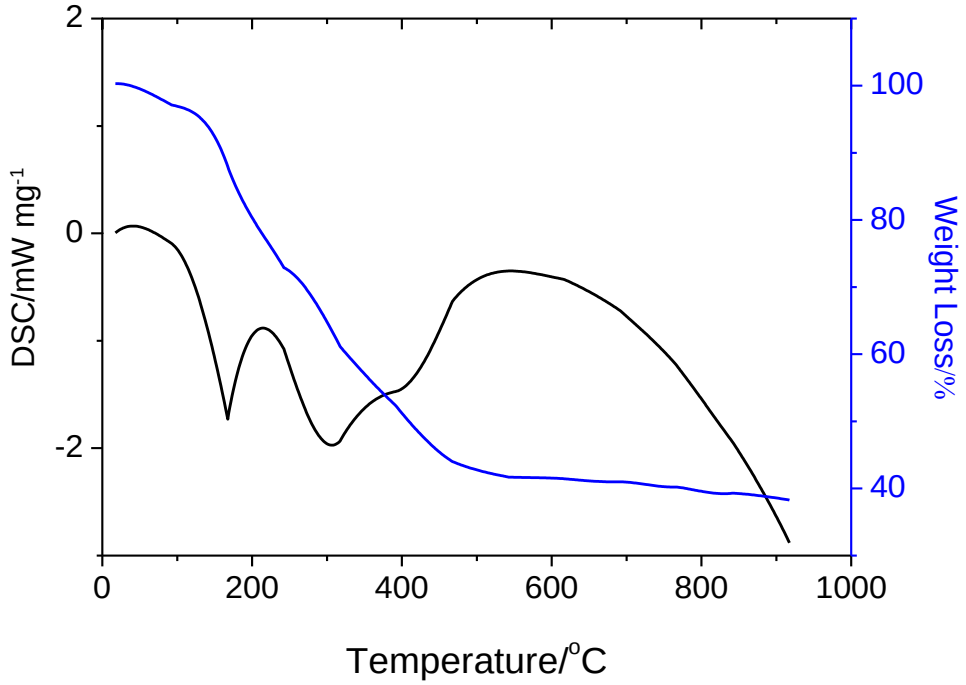

Figure S3: TGA and DSC profiles of met-Mb/P123/silica nanoparticles.

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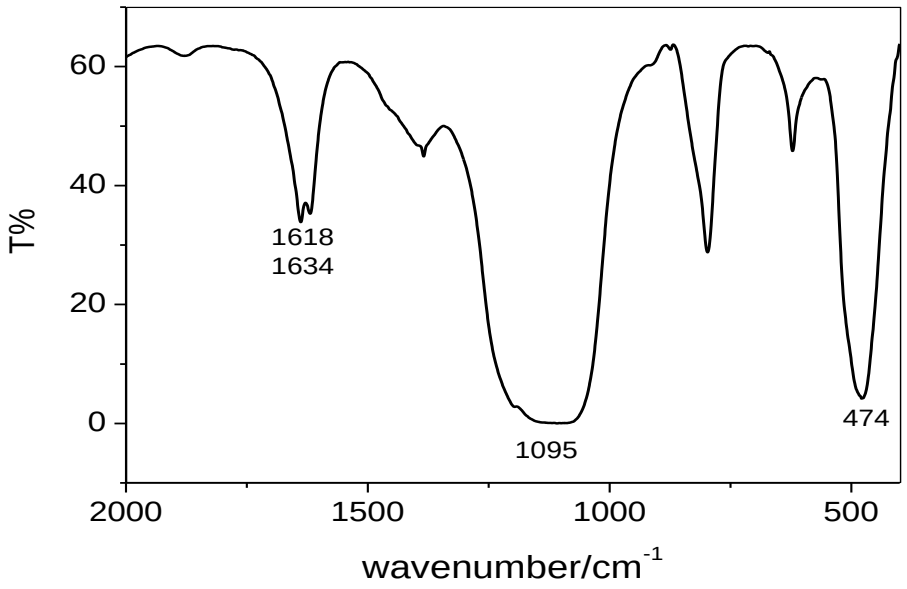

Figure S4: FTIR spectrum of residual mass after TGA analysis.of met- Mb/P123/silica nanoparticles

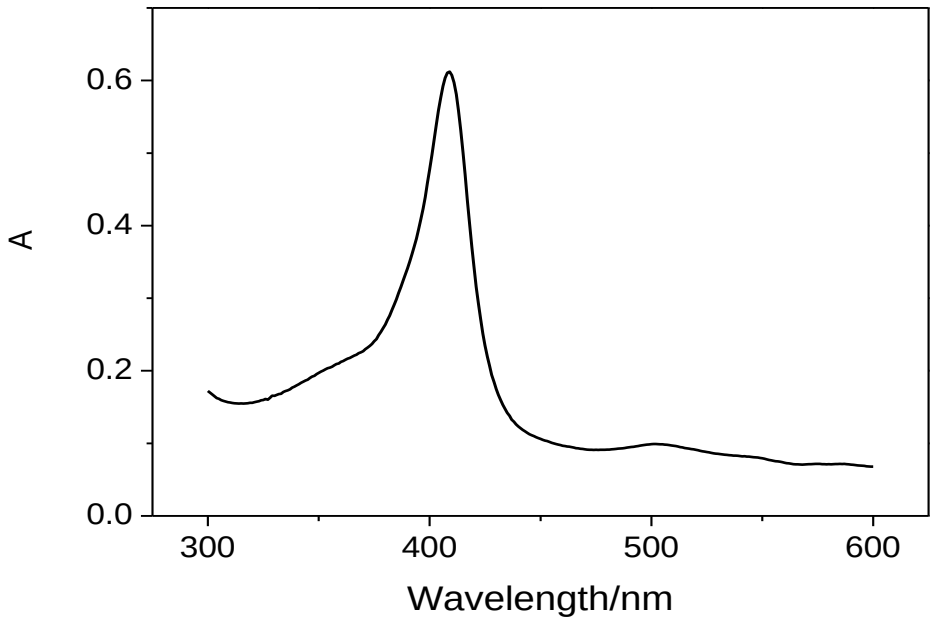

Figure S5. UV-Vis spectra of met-Mb/P123/silica nanoparticles redispersed in water .

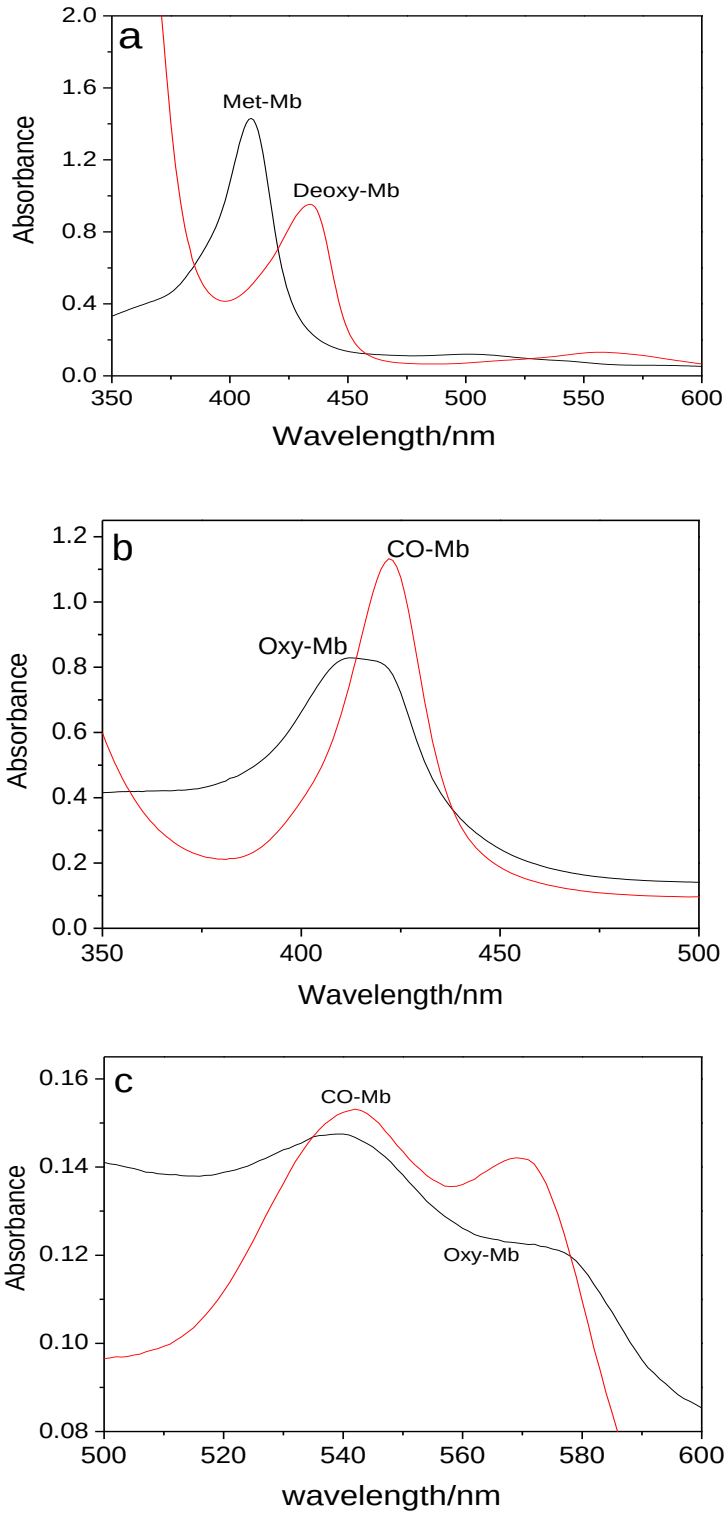

Figure S6. UV-vis spectra of (a) native met-Mb(FeIII) and deoxy-Mb(FeII) (b) CO-binding to native Mb and O_2-binding to CO-deoxyMb. (c) enlarged section of (b) at 500 -600 nm.

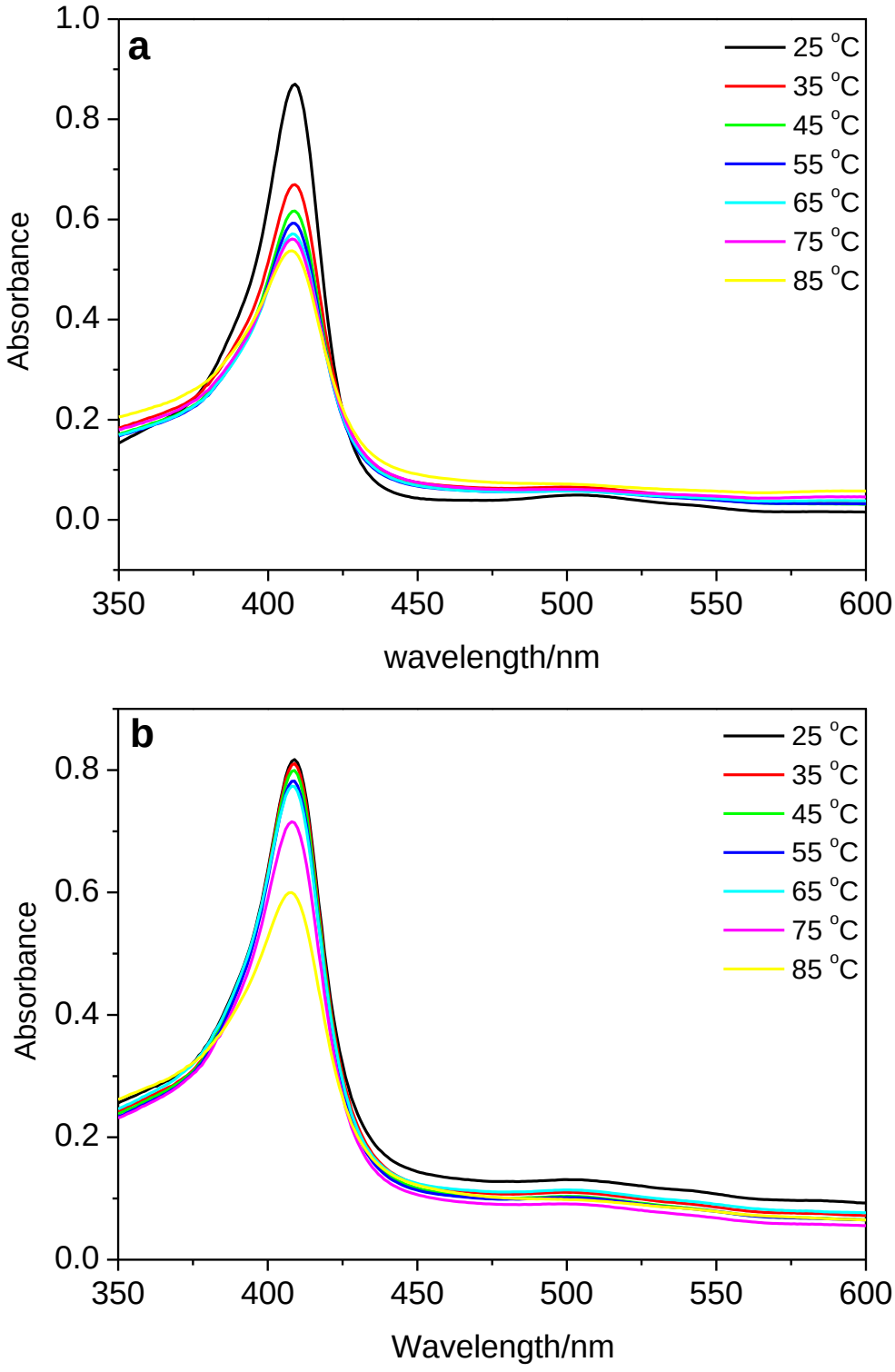

Figure S7. UV spectra of (a) native met-Mb in water, and (b) met-Mb/P123/silica nanoparticles in water at different temperatures.

Table S1: Summary of DLS data

All DLS data were determines from the size distribution by volume.

P123/oil: d =7.7-13.4nm.

P123/oil/TMOS, silica nanoparticles; d = 12.8nm

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	Hydrodynamic diameter (d, nm)	Diameter/nm(TEM)
Mb-H_2O	3.6	
P123+ oil	7.7-13.4	aggregate 40-100nm individual 2.5nm
P123 + oil + TMOS	263 nm	19 nm
MB+p123+oil	3.6 nm	
nanoconstructs/oil(Mb+P123+oil + TMOS) ≈1:10:15	8.5 nm	≈4.0nm
Nanoconstructs/oil (Mb:P123:TMOS ≈1: 50:15)		≈4.0nm
Nanoconstructs/oil (Mb:P123:TMOS =1: 10: 90)		≈4.9nm
Mb+P123+oil + TMOS ≈1:10:75	15.6 nm	
Nanoconstructs/water （Mb:p123:TMOS=1:10:15）	12.8 nm	≈4.0nm