

Supplementary Materials

Additional experiments

Figure 1 consists of four TEM images (a, b, c, d) and chemical structures illustrating the functionalization of Mn_{12} stearate with silane groups.

- Image (a):** A TEM image of a Mn_{12} stearate particle, showing a smooth, curved surface. A scale bar indicates 50 nm.
- Image (b):** A TEM image of a Mn_{12} stearate particle after functionalization with silane groups, showing a smooth, curved surface. A scale bar indicates 50 nm.
- Image (c):** A TEM image of a Mn_{12} stearate particle after functionalization with silane groups, showing a smooth, curved surface. A scale bar indicates 50 nm.
- Image (d):** A TEM image of a Mn_{12} stearate particle after functionalization with silane groups, showing a smooth, curved surface. A scale bar indicates 50 nm.

The chemical structures show the functionalization process:

- Top structure:** A Mn_{12} stearate molecule, represented as a purple hexagon with the text Mn_{12} stearate inside.
- Bottom structure:** A silane group, represented as a central Si atom bonded to three O atoms, which are in turn bonded to three H atoms. The Si atom is also bonded to a C atom, which is part of a carboxylic acid group ($\text{C}=\text{O}$ and $\text{C}-\text{OH}$).

The functionalization process is indicated by an arrow labeled "Functionalization (synthesis step III)".

As can be seen in Figure S1b, resulting material did not contain any visible (under TEM microscope) molecules at the surface. On the contrary, the material possessing carbonic acid anchoring units was successfully functionalized: the surface seems to be covered by Mn₁₂-st

molecules. On this basis, we can conclude, that the carbonic acid groups bonded SMMs and the Mn₁₂-st molecules are anchored at the silica surface via propyl-carbonic acid groups with a high probability.

We carried out the X-Ray reflectivity measurements in order to check if the resulting specimen is free from the bulk agglomeration (crystalline) of the Mn₁₂-st. Results can be seen in Figure S2.

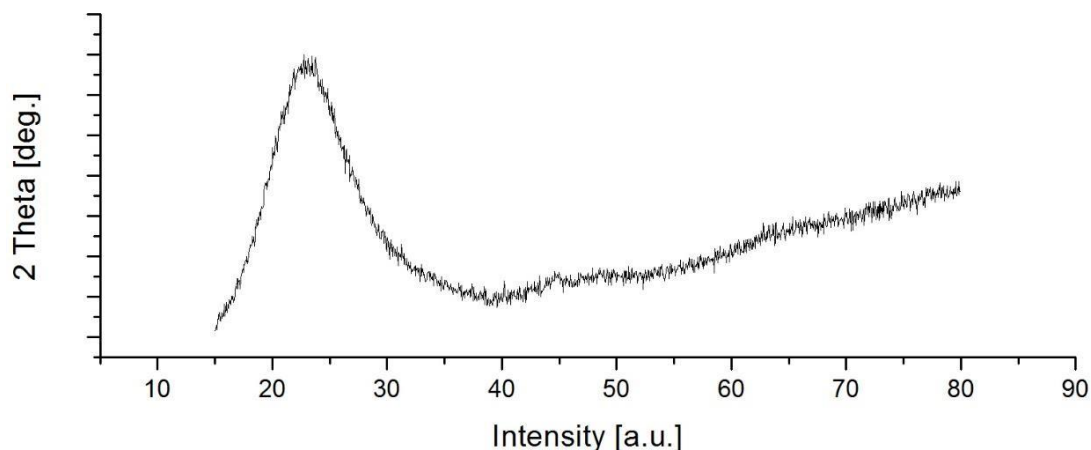


Figure S2. X-ray diffraction results for the spherical silica containing Mn₁₂-st molecules at the surface.

The X-ray showed the plot typical for amorphous silica with no crystalline reflections. However, such a result was in full accordance with our assumption: we did not expect any crystalline phases, only separated Mn₁₂ molecules.

Additionally, we carried out EDX elemental analysis and Raman spectroscopy. The amount of the Mn₁₂-st species was too low to detect it by EDX. Raman spectroscopy showed the features originating only from stearic acid since isolated Mn₁₂ molecules are very sensitive to the laser radiation.