

Supplementary Information

Programmed Self-Assembly of a Biochemical and Magnetic Scaffold to Trigger
and Manipulate Microtubule Structures

*Rémi Ducasse*¹, Wei-An Wang*¹, Marina Garcia-Jove Navarro*¹, Nicolas Debons¹, Alexandra Colin¹, Jérémy Gautier¹, Jean-Michel Guigner², François Guyot², and Zoher Gueroui¹*

¹ École Normale Supérieure, PSL Research University, CNRS, UPMC,
Department of Chemistry,
24 rue Lhomond, 75005 Paris, France

² IMPMC. Sorbonne Université. CNRS. UPMC. MNHN. IRD.
4, place Jussieu, 75005 Paris, France

* R.D, W.A.W, and M.GJ.N contributed equally to this work.

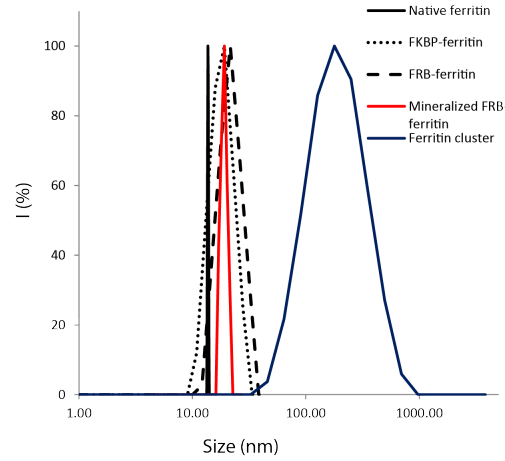
4 Supplementary figures.

Correspondence:

Zoher Gueroui

Phone: +33 1 44 32 24 09

Email: zoher.gueroui@ens.fr



Protein	mean size (nm) ^a	zeta potential (mV) ^b
Native ferritin	13.7 ± 0.55	-11.4
FKBP-ferritin	18.5 ± 8.5	-5.7
FRB-ferritin	21.9 ± 9.8	-11.1
Mineralized FRB-ferritin	19.1 ± 2.7	-1.5
Ferritin cluster	215.1 ± 279.8	-13.7

Figure S1. Size distribution of native ferritin, FKBP-ferritin, FRB-ferritin, mineralized FRB-ferritin and ferritin cluster determined by dynamic light scattering (DLS).

Table: Diameter and zeta potential of native ferritin, FKBP-ferritin, FRB-ferritin, mineralized FRB-ferritin, and ferritin cluster. ^a Mean diameter measured by dynamic light scattering (DLS) and ^b Zeta potential.

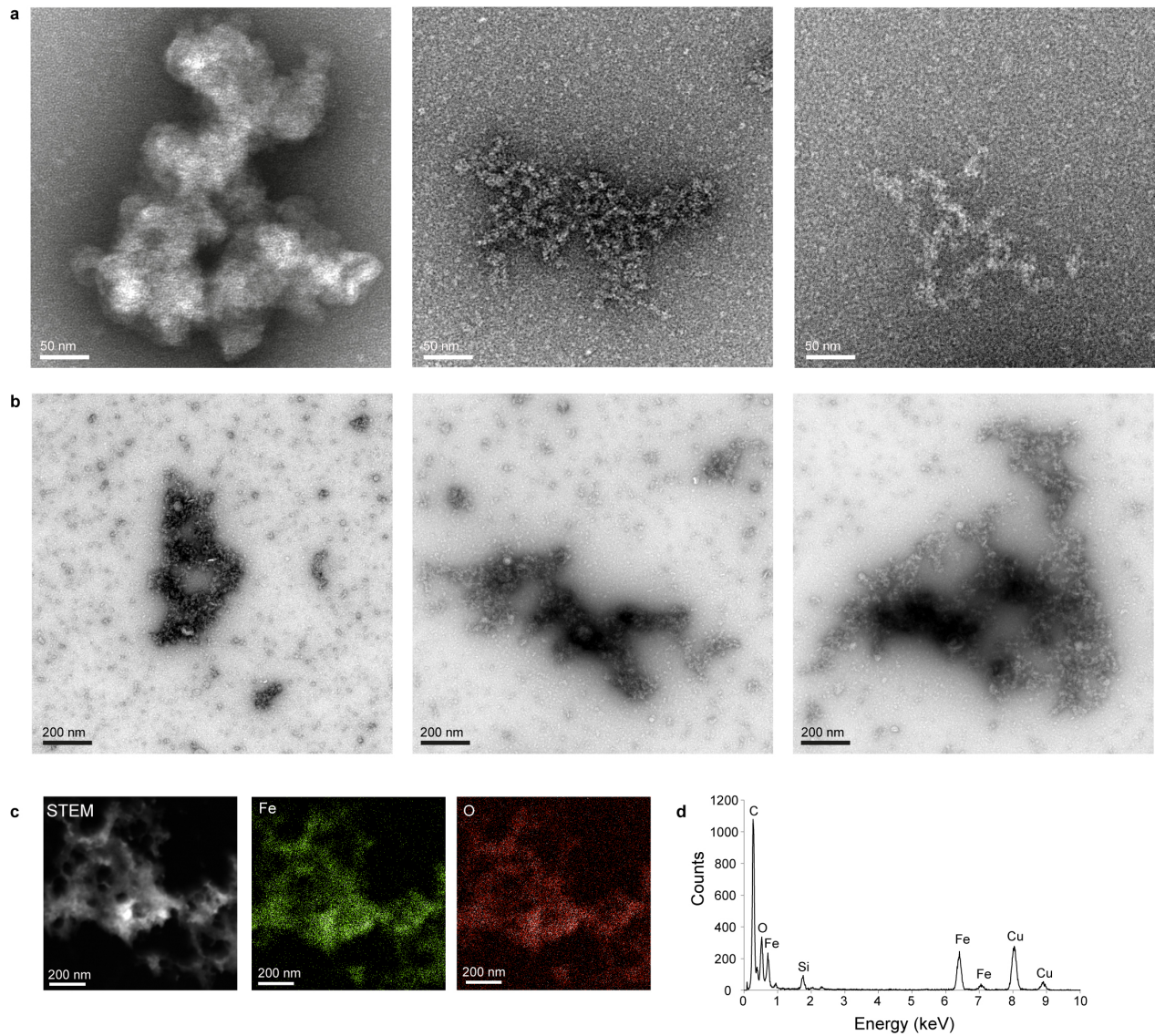


Figure S2. Characterization of ferritin assemblies and chemical analysis of biomineralised ferritin clusters: **a,b**, TEM negative staining images of ferritin clusters and mineralized ferritin clusters. **c**, STEM-EDX mapping of the ferritin cluster showing the distribution of Fe (green) and O (red) within the ferritin cluster. **d**, EDX spectrum of the ferritin cluster.

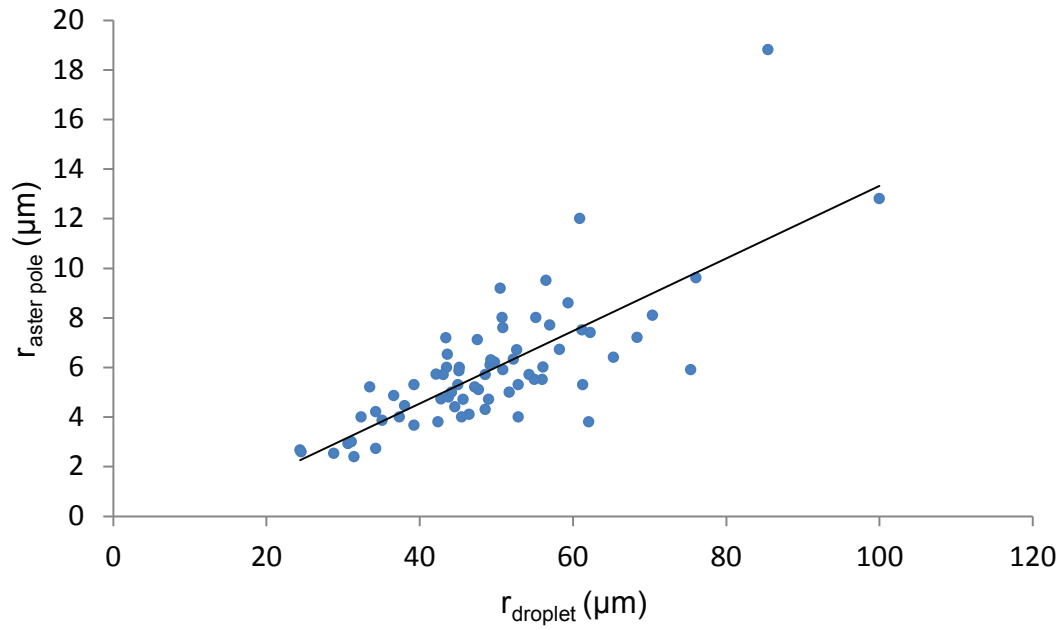


Figure S3. Plot of the radius of the aster pole entrapping the clusters of ferritins as a function of the radius of the droplets of egg extracts.

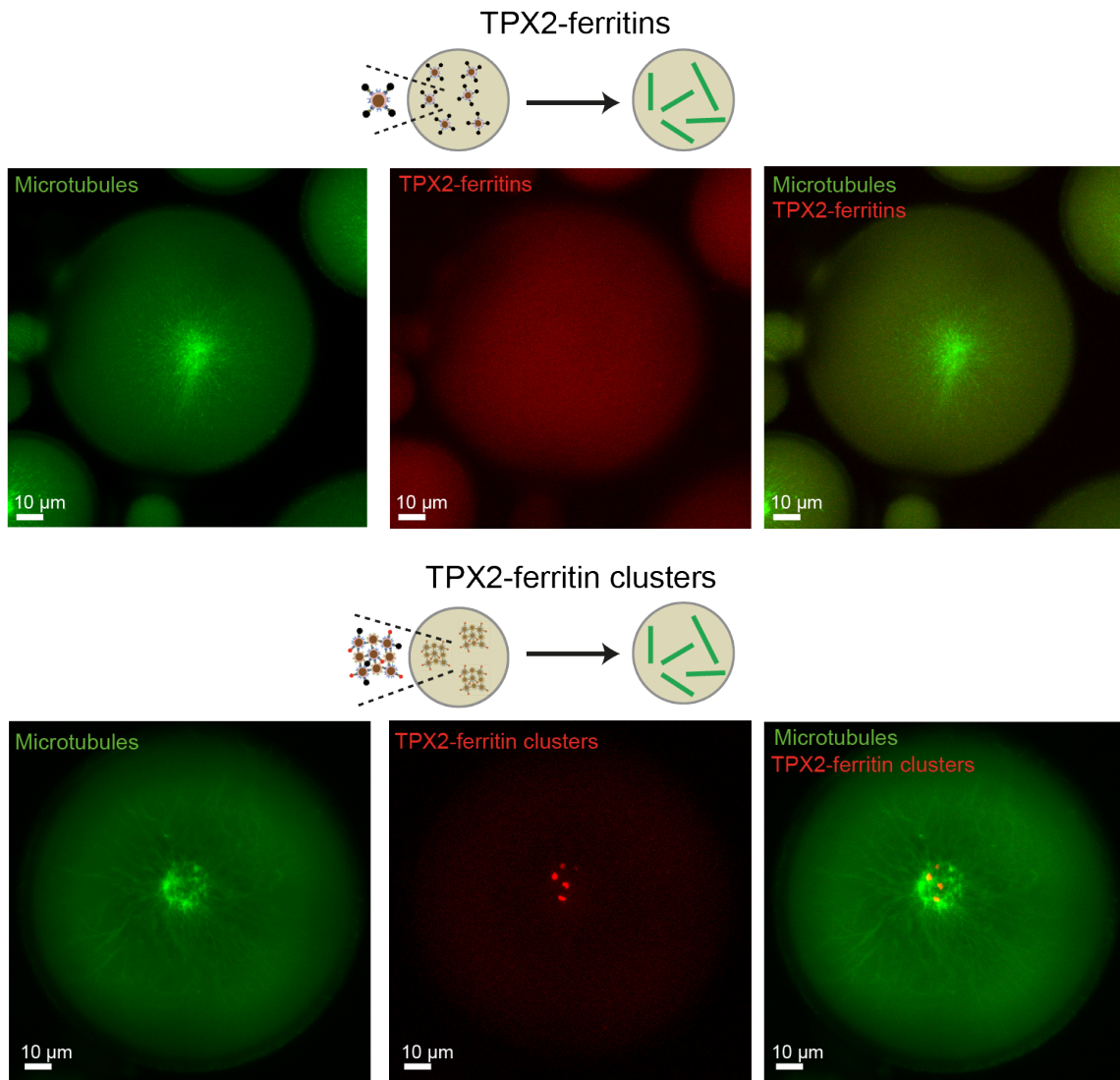


Figure S4. Confocal observation of microtubule polymerization induced by TPX2-ferritins in a droplet of *Xenopus* egg extract (top: freely diffusing TPX2-ferritins, bottom: clusters of TPX2-ferritins).