ELECTRONIC SUPPLEMENTARY INFORMATION

Spin transition nanoparticles made electrochemically

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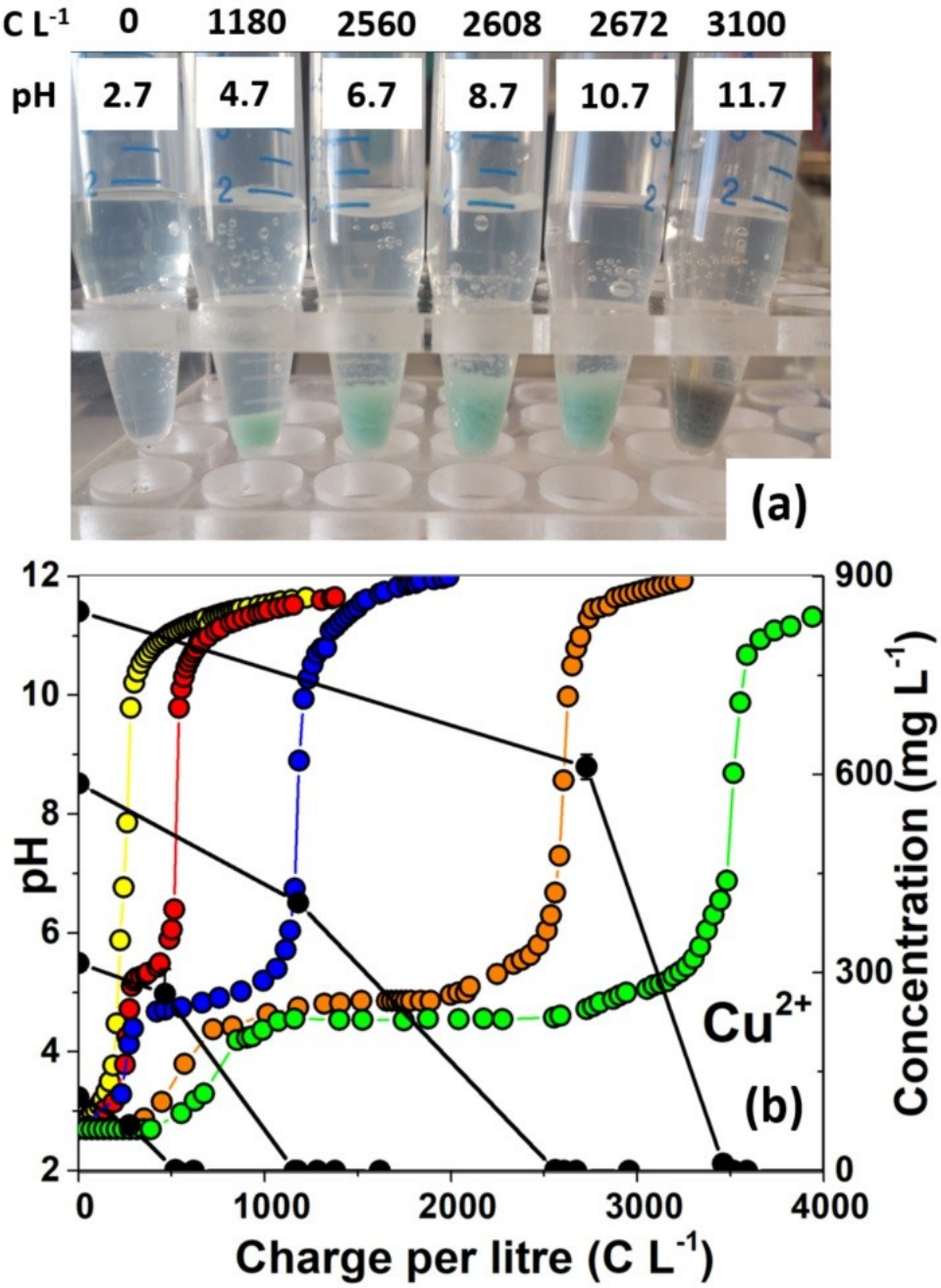


Figure ESI1. (a) Photograph of liquid samples taken at different pH using 9 mM of Cu^{2+} as metal precursor (orange line) according to increasing charge density (0 to 3100 C L^{-1}). (b) Effect of single Cu^{2+} concentration on charge density consumption using $CuCl_2$ as metal precursor.

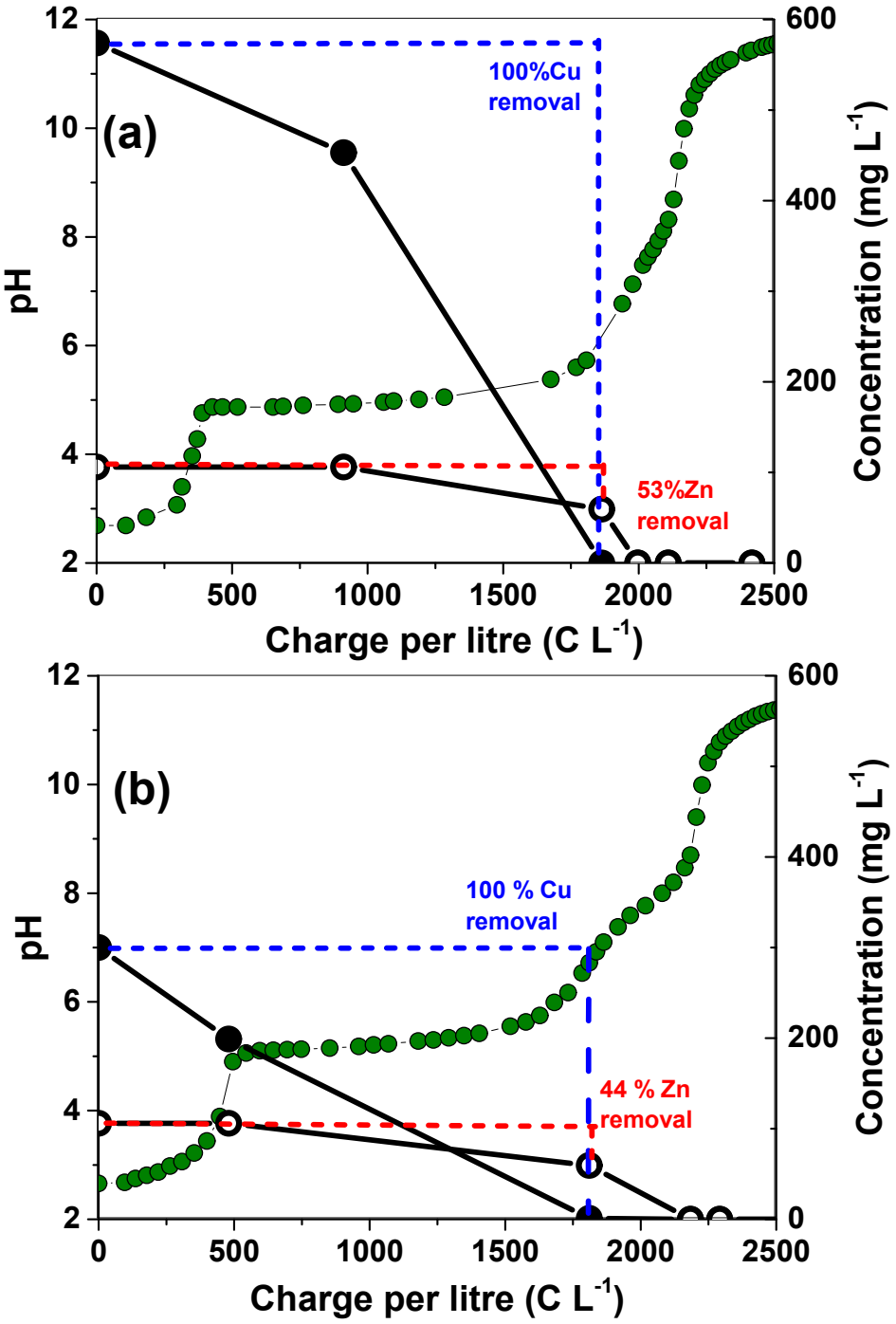


Figure ESI2. Effect of mixed Cu^{2+} and Zn^{2+} concentration on charge consumption during the synthesis of herberthsmithite. (a) High initial Cu^{2+} concentration ; (b) Low initial Cu^{2+} concentration.

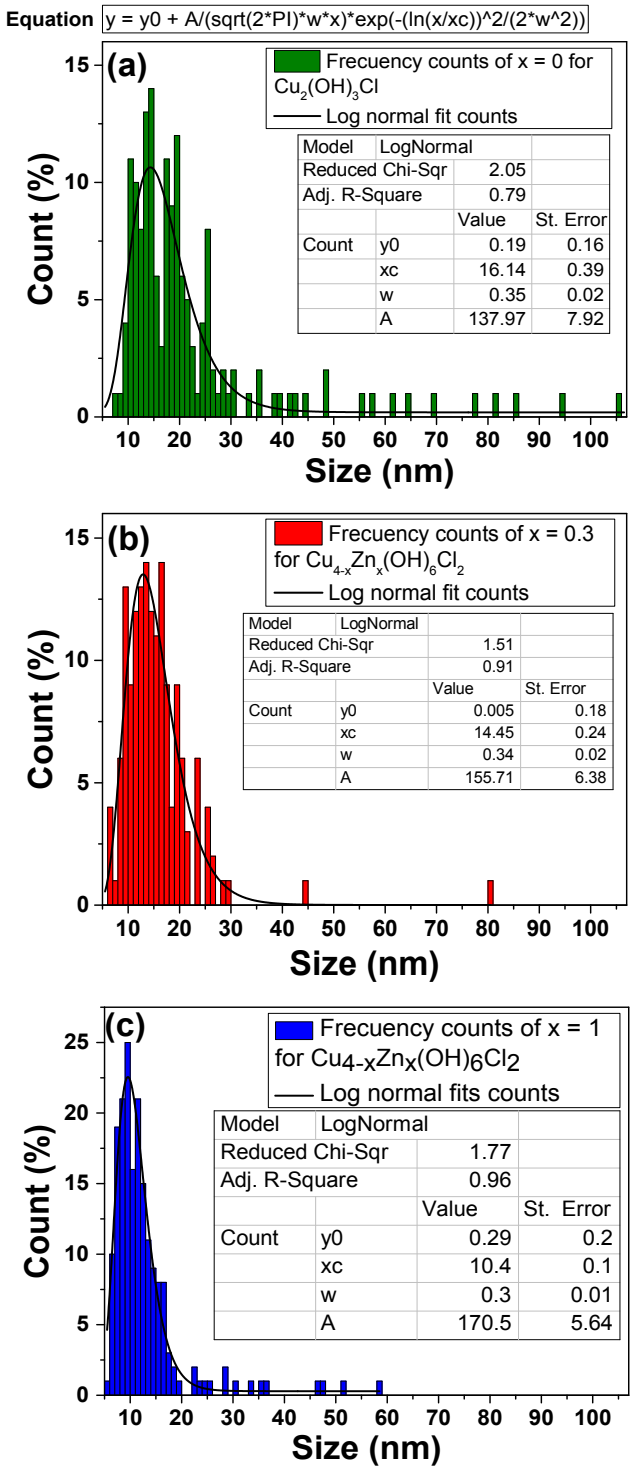


Figure ESI3. Mean particle size and distribution of $Zn_xCu_{4-x}(OH)_6Cl_2$ products with a desired value for *x,* a) $x = 0$ for clinoatacamite ; b) $x = 0.3$ for paratacamite and c) $x = 1$ for herbertsmithite.

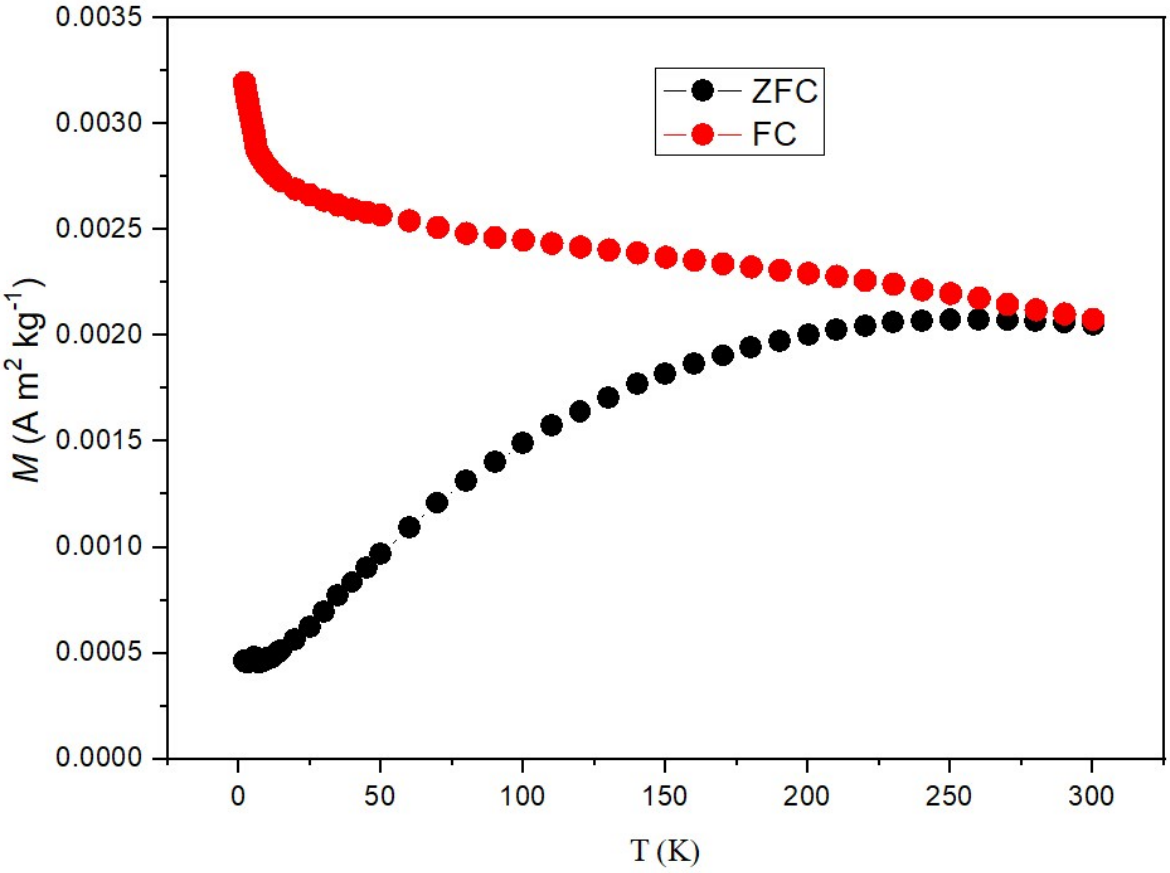
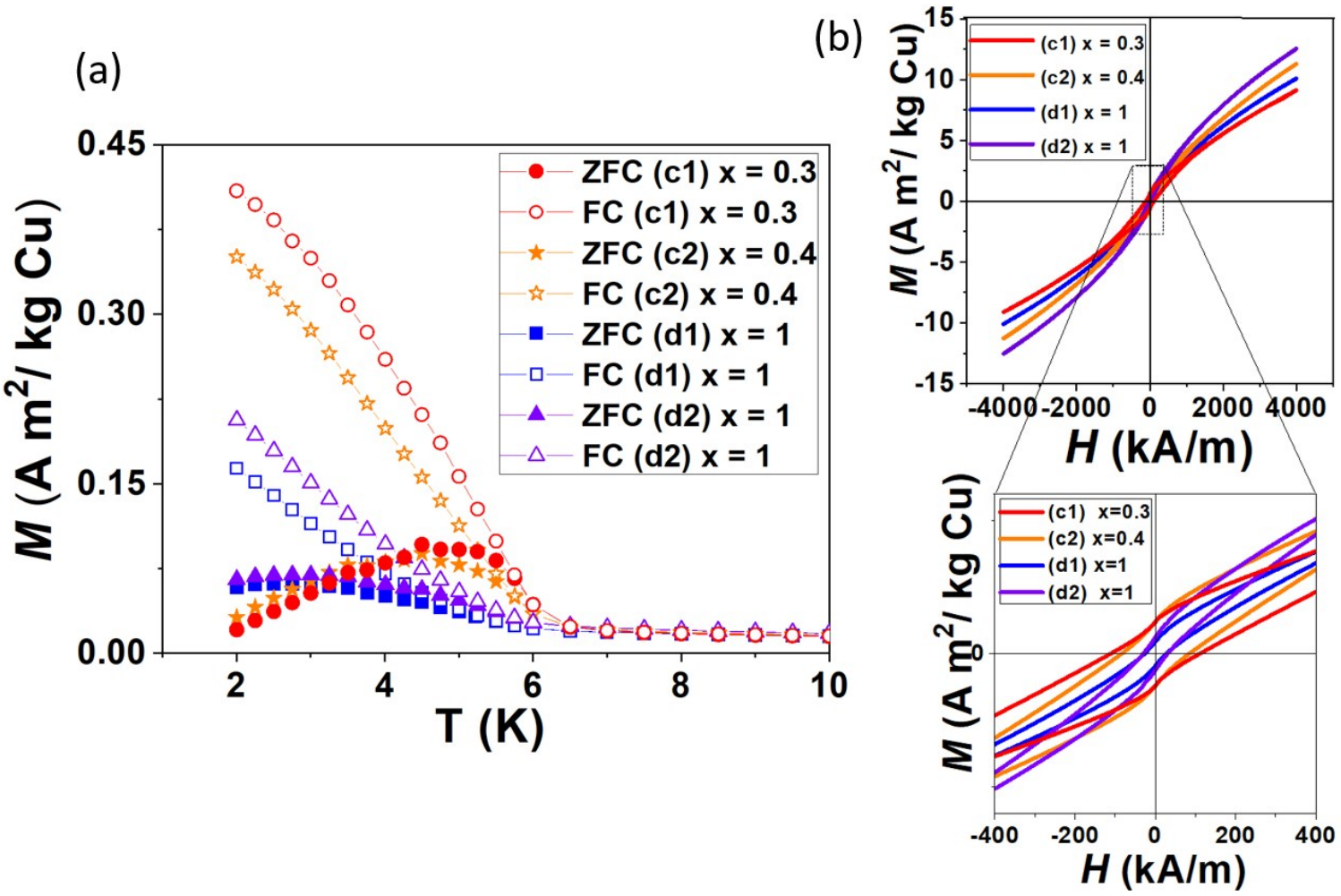


Figure ESI4. Temperature dependence of mass magnetization (*M*) at 8 kA/m (100 Oe) for CuO as measured under ZFC-FC conditions.

Table S1. Quantitative phase analysis (QPA) by Rietveld method and ICP-OES of powder samples.

Sample code	Charge consumed ($C\ L^{-1}$)	ICP powder mg g^{-1} solid		(mmol)		Cu/Zn ratio	Phase percentage (%)				Cu and Zn in $Cu_{4-x}Zn_x(OH)_6Cl_2$		Stoichiometric coefficient
		Cu	Zn	Cu	Zn		$Cu_{4-x}Zn_x(OH)_6Cl_2$	ZnO	$Cu(OH)_2$	CuO	Cu (mM)	Zn (mM)	(x)
Sample (a)	987	546		8.6			100	0	0	0	8.6		0
Sample (b)	1876	783		12.3						100	12.3		0
Sample (c1)	778	469	64	7.4	1.0	7.3	82	3.2	15	0	7.1	0.8	0.3
Sample (c2)	850	524	72	8.3	1.1	7.3	98	1.6	1.8	0	8.2	1.1	0.4
Sample (d1)	2000	462	150	7.3	2.3	3.1	77	15	8	0	6.2	2.1	1.0
Sample (d2)	2018	467	144	7.4	2.2	3.2	80	16	4	0	6.2	2.1	1.0



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96 **Figure EIS5**. (a) ZFC-FC thermal magnetization of a duplicates sample with stoichiometric coefficient (x =1 and x= 0.3). (b)

97 Magnetization against field over temperature sweep at 2.0 K in duplicate samples.