Electronic Supplementary Information

Synthesis and magnetic properties of nanostructured metallic Co, Mn and Ni oxide materials obtained from solid-state metal-macromolecular complexes precursors

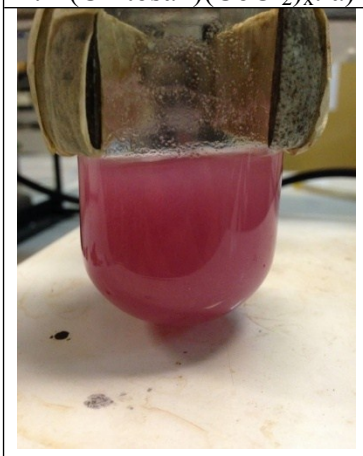
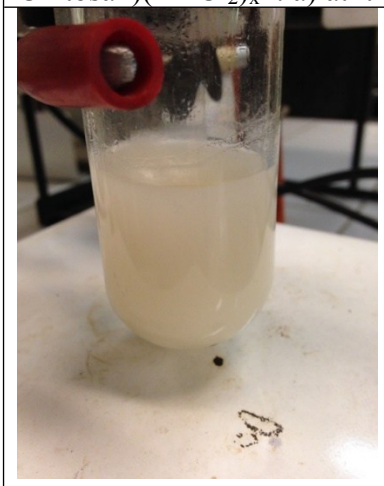
Carlos Diaz[1], María L. Valenzuela[2*], Miguel A. Laguna-Bercero[3], Alodia Orera[3], Daniela Bobadilla[1], Sebastián Abarca[1] and Octavio Peña [4]*

1 Departamento de Química, Facultad de Química, Universidad de Chile. La Palmeras 3425, Ñuñoa, casilla 653, Santiago de Chile, Chile
2 Universidad Autónoma de Chile, Instituto de Ciencias Químicas Aplicadas, Inorganic Chemistry and Molecular Material Center. Av. El Llano Subercaseaux 2801. San Miguel. Santiago de Chile, Chile.
3 Instituto de Ciencia de Materiales de Aragón (ICMA), CSIC- Universidad de Zaragoza C/ Pedro Cerbuna 12, E-50009, Zaragoza, Spain.
4 Sciences Chimiques de Rennes UMR-CNRS 6226, Université de Rennes 1,35042 Rennes cedex, France.

S_1 Table 1. Experimental Details of the reaction formation of the precursors 1-3

Number	Precursor	g. of Chitosan	g. of metallic salt	ml of solvent	Reaction time	Color of the product
1.-	**Chitosan▪($MnCl_2$)**	**0.52**	**0.6**	**30**	**2 week**	**white**
2.-	**Chitosan▪($CoCl_2$)**	**0.79**	**0.6**	**30**	**2 week**	**blue**
3.-	**Chitosan ▪($NiCl_2$)**	**0.43**	**0.6**	**50**	**1 week**	**green**

S_2 Illustrations showing the color of the precursors

1.- (Chitosan)$(CoCl_2)_x$: a) at t=0	b) at t= after 7 days
	
Chitosan)$(MnCl_2)_x$: a) at t=0	b) at t= after 7 days
	
(Chitosan)$(NiCl_2)_x$ (a) at t=0	b) at t= after 7 days
	

S_3 Table 2 Precursors and their estimated metal contents by TG/DSC and elemental Analysis

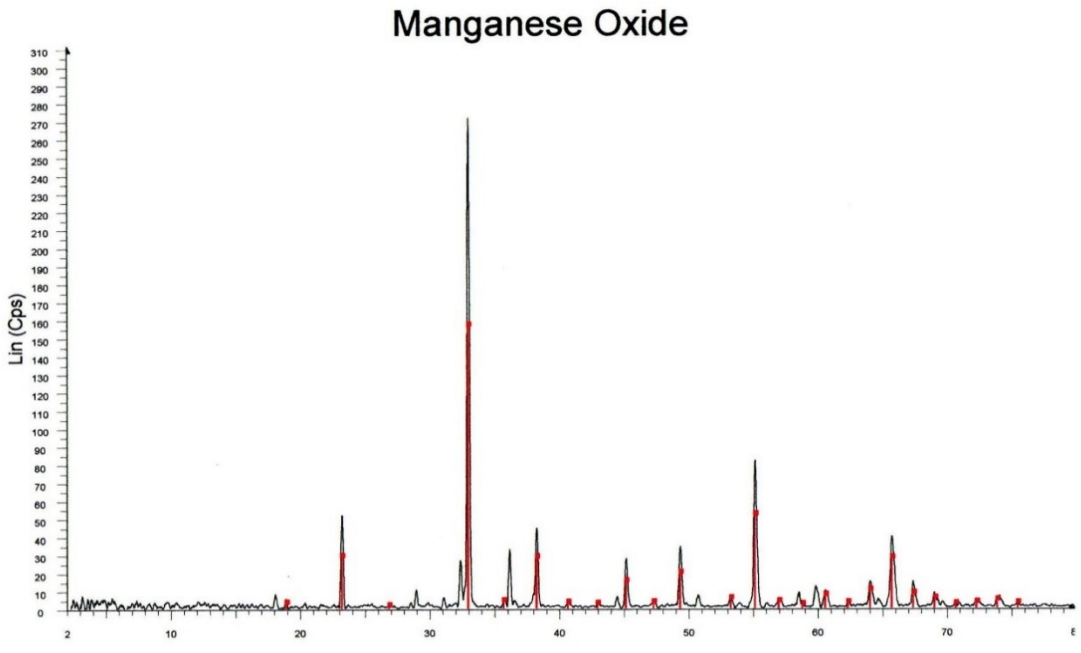
Number	Precursor	% TG/DSC	% elemental analysis
1.-	Chitosan▪($MnCl_2$)	45	46
2.-	Chitosan▪($CoCl_2$)	86	89
3.-	Chitosan▪($NiCl_2$)	89	92

S_4 Table 3 ν(OH) data of the Chitosan▪(ML_n) precursor

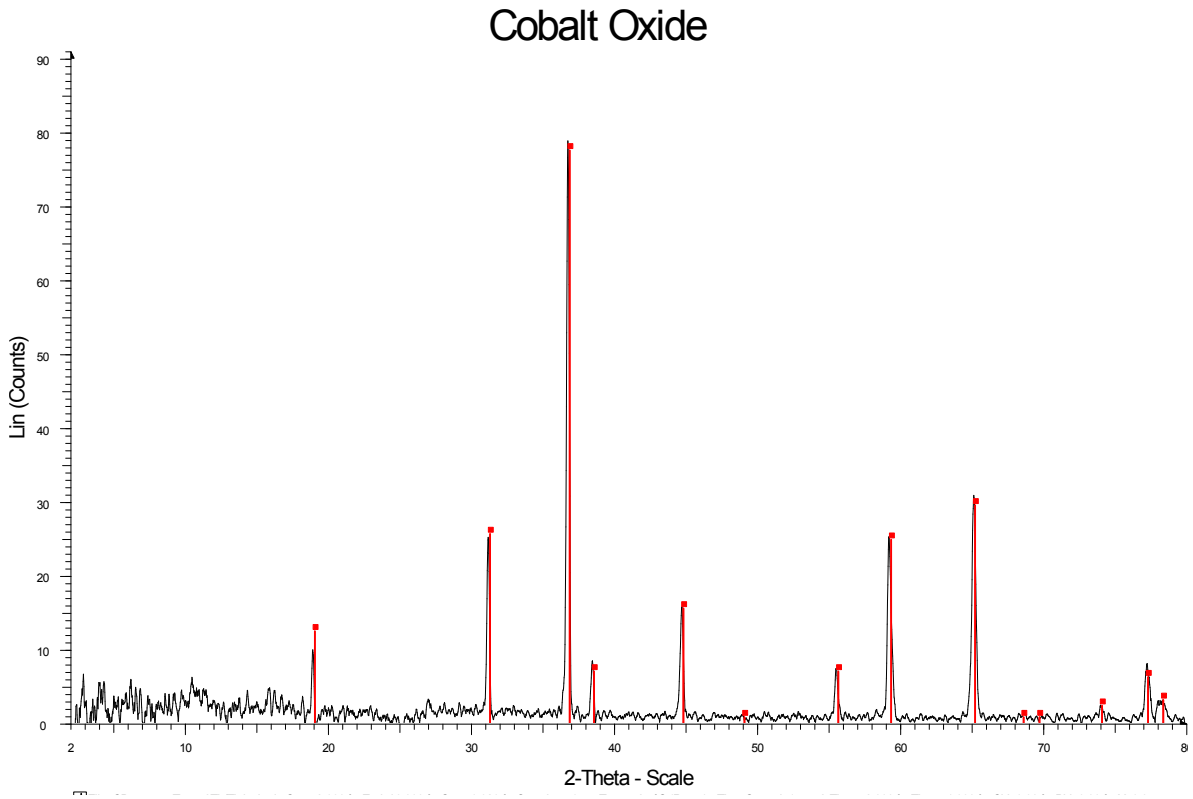
Number	Precursor	ν(OH) cm^{-1}
	Chitosan	3448
1.-	Chitosan▪($MnCl_2$)	3393
2.-	Chitosan▪($CoCl_2$)	3382
3.-	Chitosan▪($NiCl_2$)	3345

S_5 XRD Patterns of Mn_2O_3, Co_3O_4 and NiO.

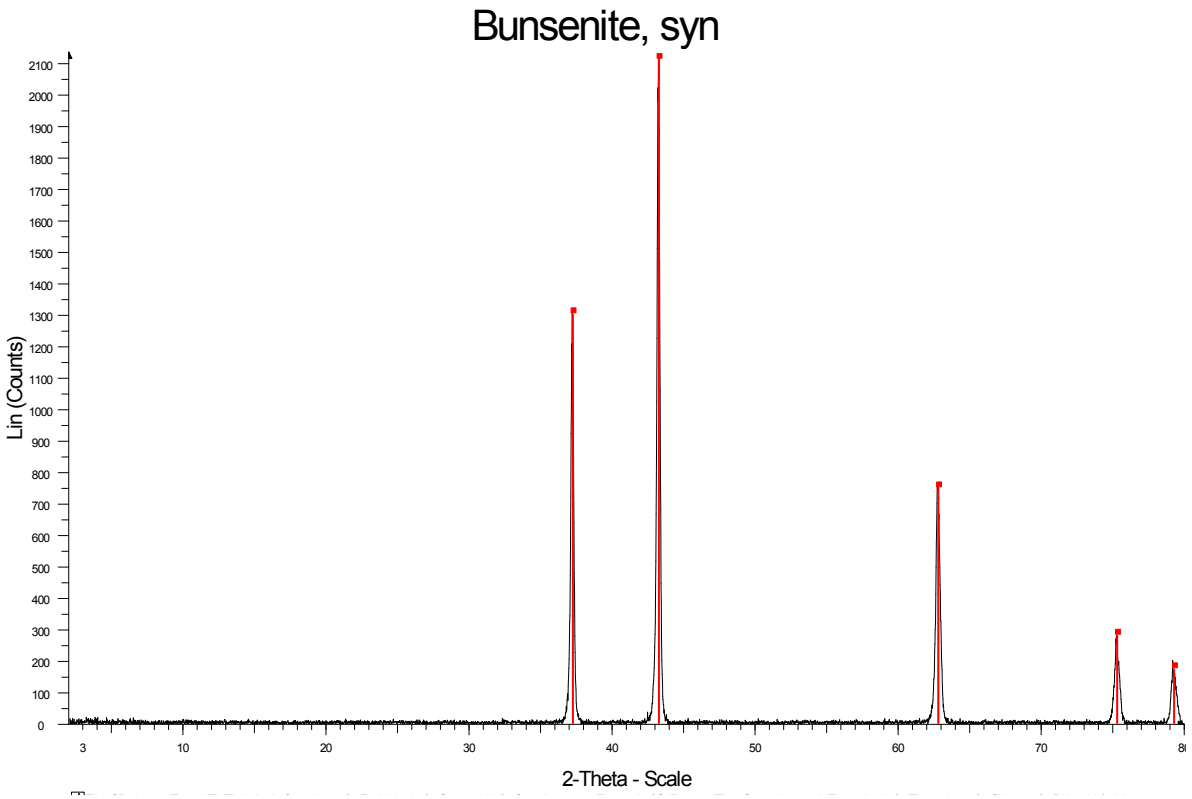
A) Mn_2O_3



B) Co_3O_4


Cobalt Oxide
Lin (Counts)
0
10
20
30
40
50
60
70
80
90
2
10
20
30
40
50
60
70
2-Theta - Scale

C) NiO



The red bars are the respective patterns from the library data.

S_6 Table 4 ID/IG ratio measured for precursors 1,2 and 3 in several zones with a 15 mW laser power. Samples pirolized at 400 °C.

Precursor	Zone	ID/IG ratio
1.-	1	2.29
	2	2.04
2.-	1	1.43
	2	1.49
3.-	1	2.12
	2	1.82
	3	2.38
	4	1.99