10.1071/CH19581_AC

Australian Journal of Chemistry 2020, 73(11), 1080-1087

Supplementary Material

Electrochemistry of Neodymium in Phosphonium Ionic Liquids: The Influence of Cation, Water Content and Mixed Anions

Laura Sanchez-Cupido,[A] Jennifer M. Pringle,[B] Amal Siriwardana,[A] Cristina Pozo-Gonzalo,[B,C] and Maria Forsyth[B]

[A]TECNALIA, Basque Research and Technology Alliance (BRTA), Paseo Mikeletegi 2, 20009 San Sebastián, Spain.

[B]Institute for Frontier Materials, Deakin University, Melbourne, Vic. 3125, Australia.

[C]Corresponding author: cpg@deakin.edu.au

Table S1 Composition of the deposits obtained from different ionic liquids and potential conditions according to the EDS analysis expressed in wt-%

Deposit obtained from 0.1 mol/kg $Nd(TFSI)_3$/$[P_{66614}][TFSI]$ with 0.3 wt-% H_2O applying a potential of -2.8 V vs Fc/Fc^+ at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	39.9	23.6	-	28.5	4.9	1.9	1.3
Zone 2	52.6	17.6	-	27.2	-	2.6	-
Zone 3	18.7	18.7	23.6	31.1	4.3	1.3	-
Zone 4	25.3	17.0	26.5	26.0	3.8	1.4	-
Zone 5	7	9.7	38.1	39.5	4.4	1.4	-

Deposit obtained from 0.1 mol/kg $Nd(TFSI)_3$/$[P_{66614}][TFSI]$ with 0.4 wt-% H_2O applying a potential of -3.8 V vs Fc/Fc^+ at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	30.5	27.1	41.0		0.4	0.4	0.9
Zone 2	8.2	14.4	56.9	19.52	-	-	0.3

Deposit obtained from 0.1 mol/Kg $Nd(TFSI)_3$ /$[P_{111i}4][FSI]$ applying a potential of -0.8 V vs Fc/Fc^+ at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	49.8	11.7	-	13.7	3.4	16.9	4.5

Zone 2	23.4	11.3	34.3	14.6	3.4	10.1	2.9
Zone 3	10.7	12.9	46.1	18.0	5.1	5.7	1.6

Deposit obtained from 0.1 mol/Kg $Nd(TFSI)_3$ /$[P_{111i}4][FSI]$ applying a potential of -1.6 V vs Fc/Fc^+ at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	39.2	5.8	13.9	14.9	12.4	8.3	5.5
Zone 2	39.3	7.0	11.5	21.5	11.3	6.0	3.4
Zone 3	38.6	6.8	14.8	15.7	14.2	6.0	3.9
Zone 4	9.2	14.0	57.8	9.0	7.5	2.7	-

Deposit obtained from 0.1 mol/ Kg $Nd(TFSI)_3$ in 75/25 wt-% of $[P_{66614}][TFSI]/[P_{66614}][TfO]$ applying a potential of -2.5 V vs Fc/Fc^+ during 1 hour at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	25.1	28.5	23.7	20.5		0.9	0.8
Zone 2	31.5	22.7	15.5	20.7	7.3	2.3	

Deposit obtained from 0.1 mol/ Kg $Nd(TFSI)_3$ in 75/25 wt-% of $[P_{66614}][TFSI]/[P_{66614}][TfO]$ applying a potential of -3.2 V vs Fc/Fc^+ during 1 hour at 75°C

% wt	Nd	O	Cu	C	F	S	P
Zone 1	18.7	23.2	36.1	19.2	2.1	0.3	0.6
Zone 2	14.1	18.1	66.6	-	-	0.4	0.8

Deposit obtained from 0.1 mol/kg $Nd(TfO)_3$ /$[P_{66614}][DCA]$ applying a potential of -3.2 V vs Fc/Fc^+ during 1 hour at 75°C

% wt	Nd	O	N	C	P	Cu	Cl
Zone 1	35.3	28.0	14.4	28.0	0.9	-	1.0
Zone 2	46.2	13.1	8.2	23.7	-	8.9	-
Zone 3	39.3	16.2	10.6	27.5	-	5.3	1.1