

Supporting information for **‘Ionic liquid ion exchange: exclusion from strong interactions
condemns cations to the most weakly interacting anions and dictates reaction equilibrium‘**

Table SI1. Anion exchange (%) for 1 mmol anion added as sodium salt in MilliQ-water (5mL) to 1 mmol ionic liquid

Table SI2. Anion exchange (%) for 1 mmol anion added as sodium salt to 1 mmol trihexyl(tetradecyl)phosphonium ionic liquid

Table SI3. Anion exchange (%) for 1 mmol anion added as sodium salt to 1 mmol 1-butyl-3-methylimidazolium ionic liquid

Table SI4. Anion exchange (%) in function of time for 1 mmol NaNO_3 added to 1 mmol trihexyl(tetradecyl)phosphonium chloride.

Table SI1. Anion exchange (%) for 1 mmol anion added as sodium salt in MilliQ-water (5mL) to 1 mmol ionic liquid. Averages and standard deviations of three replicates.

	P _{666,14} Cl	P _{666,14} NO ₃	P _{666,14} ClO ₄
Cl	\	8.2 ± 0.3	0.1 ± 0.0
OAc	20.1 ± 3.1	3.8 ± 0.9	1.6 ± 1.5
NO ₃	90.3 ± 1.9	\	0.1 ± 0.5
I	96.1 ± 0.6	80.8 ± 2.5	12.7 ± 0.6
ClO ₄	98.1 ± 1.3	98.7 ± 1.4	ND

Table SI2. Anion exchange (%) for 1 mmol anion added as sodium salt to 1 mmol trihexyl(tetradecyl)phosphonium ionic liquid. Averages and standard deviations for three replicates.

	P _{666,14} Cl	P _{666,14} NO ₃	P _{666,14} ClO ₄
Cl	\	1.9 ± 0.6%	2.0 ± 1.8%
OAc	18.7 ± 1.4%	20.7 ± 2.1%	2.7 ± 3.0%
NO ₃	28.9 ± 0.6%	\	0.7 ± 1.3%
I	97.7 ± 4.0%	82.0 ± 4.6%	36.8 ± 3.8%
ClO ₄	100.5 ± 3.2%	93.8 ± 3.4%	ND

Table SI3. Anion exchange (%) for 1 mmol anion added as sodium salt to 1 mmol 1-butyl-3-methylimidazolium ionic liquid. Averages and standard deviations for three replicates.

	Bmim Cl	Bmim NO ₃	Bmim ClO ₄
Cl	\	5.2 ± 3.0%	0
OAc	60.0 ± 0.4%	25.4 ± 0.4%	7.1 ± 0.1%
NO ₃	94.1 ± 1.1%	\	1.6 ± 0.3%
I	96.3 ± 1.8%	80.8 ± 0.9%	33.5 ± 5.0%
ClO ₄	98.1 ± 0.7%	86.9 ± 0.7%	ND

Table SI4. Anion exchange (%) in function of time for 1 mmol NaNO₃ added to 1 mmol trihexyl(tetradecyl)phosphonium chloride. Averages and standard deviations for three replicates.

Time (sec)	Anion exchange (%)
5	89.1 ± 0.9
30	88.0 ± 0.3
60	88.0 ± 2.8
120	90.9 ± 1.5
300	92.3 ± 1.8
600	93.2 ± 2.5

Table SI5. Conversion of esterification of acetic acid to ethyl acetate (0.33 mmol acetic acid, 3 eq. ethanol, 0.1 eq. sulfuric acid, 75 °C, 2 hours) in 6 different anion trihexyl(tetradecyl)phosphonium ionic liquids (1 mmol), and amount of free acetic acid detected after anion exchange in the same conditions, without ethanol

	Esterification (%)	Free acetic acid after anion exchange (%)
P _{666,14} Cl	15.4 ± 3.8	46.0 ± 1.3
P _{666,14} NO ₃	38.9 ± 2.5	57.6 ± 0.6
P _{666,14} HSO ₄	56.7 ± 3.4	57.7 ± 0.2
P _{666,14} SCN	65.1 ± 5.2	67.6 ± 1.8
P _{666,14} ClO ₄	85.7 ± 1.6	102.0 ± 2.3
P _{666,14} NTf ₂	85.9 ± 1.3	105.8 ± 5.2