

Carbon capture with ionic liquids: overview and progress

Xiangping Zhang,^a Xiaochun Zhang^a, Haifeng Dong^a, Zhijun Zhao^{a,b} and Suojiang Zhang^{*a}

Abbreviations of ionic liquids:

Physisorption:

Abbreviation	Full name
[bmim][PF ₆]	1-butyl-3-methylimidazolium hexafluorophosphate
[C ₆ mim][PF ₆]	1-hexyl-3-methylimidazolium hexafluorophosphate
[C ₈ mim][PF ₆]	1-octyl-3-methylimidazolium hexafluorophosphate
[C ₉ mim][PF ₆]	1-nonyl-3-methylimidazolium hexafluorophosphate
[emim][BF ₄]	1-ethyl-3-methylimidazolium tetrafluoroborate
[bmim][BF ₄]	1-butyl-3-methylimidazolium tetrafluoroborate
[C ₆ mim][BF ₄]	1-hexyl-3-methylimidazolium tetrafluoroborate
[C ₈ mim][BF ₄]	1-octyl-3-methylimidazolium tetrafluoroborate
[N-bupy][BF ₄]	N-butylpyridinium tetrafluoroborate
[bmim][NO ₃]	1-butyl-3-methylimidazolium nitrate
[HOPmim][NO ₃]	hydroxypropylmethylimidazolium nitrate
[emim][Tf ₂ N]	1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide
[bmim][Tf ₂ N]	1-butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide
[dmim][Tf ₂ N]	1,2-dimethylimidazolium bis(trifluoromethylsulfonyl)imide
[hmim][Tf ₂ N]	1-hexyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide
[P14,6,6,6][Tf ₂ N]	trihexyltetradecylphosphonium bis(trifluoromethylsulfonyl)imide
[BMP][Tf ₂ N]	1-butyl-1-methylpyrrolidinium bis(trifluoromethylsulfonyl)imide
[bmim][DCA]	1-butyl-3-methylimidazolium dicyanamide
[bmim][TfO]	1-butyl-3-methylimidazolium trifluoromethanesulfonate
[emim][EtSO ₄]	1-ethyl-3-methylimidazolium ethylsulfate
[emim][C ₂ N ₃]	1-ethyl-3-methylimidazolium dicyanamide
[emim][Ac]	1-ethyl-3-methylimidazolium acetate
[bmim][Ac]	1-butyl-3-methylimidazolium acetate
[emim][TFA]	1-ethyl-3-methylimidazolium trifluoroacetate
[bmim][SCN]	1-butyl-3-methylimidazolium thiocyanate
HEF	2-hydroxy ethylammonium formate
THEAA	tri-(2-hydroxy ethyl)-ammonium acetate
HEAF	2-(2-hydroxy ethoxy)-ammonium formate
HEAA	2-(2-hydroxy ethoxy)-ammonium acetate
[emim][MDEGSO ₄]	1-ethyl-3-methylimidazolium 2-(2-methoxyethoxy)ethylsulfate
TEGO IL K5	quaternary ammonium compounds, coco alkylbis (hydroxyethyl)methyl, ethoxylated, chlorides, methyl chloride

Chemisorption:

Abbreviation	Full name
[NH ₂ p-bim][BF ₄]	1-propylamide-3-butyl imidazolium tetrafluoroborate
[P(C ₄) ₄][Ala]	Tetrabutylphosphonium l- α -aminopropionic acid salt
[P(C ₄) ₄][Gly]	Tetrabutylphosphonium aminoethanoic acid salt
[P ₆₆₆₁₄][Met]	trihexyl(tetradecyl)phosphonium methioninate
[P ₆₆₆₁₄][Pro]	trihexyl(tetradecyl)phosphonium proline
[aP ₄₄₄₃][Gly]	(3-Aminopropyl)tributylphosphonium aminoethanoic acid salt
[aP ₄₄₄₃][Ala]	(3-Aminopropyl)tributylphosphonium l- α -aminopropionic acid salt
[aemmim][Tau]	1-aminoethyl-2,3-dimethylimidazolium taurine salt
[MTBDH ⁺][TFE ⁻]	9-methyl-2,3,4,6,7,8-hexahydropyrimido[1,2-a]pyrimidine trifluoroethanol
[MTBDH ⁺][Im ⁻]	9-methyl-2,3,4,6,7,8-hexahydropyrimido[1,2-a]pyrimidine imidazole
[(P ₂ -Et)H ⁺][TFE ⁻]	Tetramethyl(tris(dimethylamino)phosphoranylidene)phosphorictriamid-Et-imin trifluoroethanol
[MTBDH ⁺][TFPA ⁻]	9-methyl-2,3,4,6,7,8-hexahydropyrimido[1,2-a]pyrimidine (1-phenyl)trifluoroethanol
[(P ₂ -Et)H ⁺][Im ⁻]	Tetramethyl(tris(dimethylamino)phosphoranylidene)phosphorictriamid-Et-imin imidazole
[MTBDH ⁺][Pyr ⁻]	9-methyl-2,3,4,6,7,8-hexahydropyrimido[1,2-a]pyrimidine pyrrolidone
[(P ₂ -Et)H ⁺][Pyr ⁻]	Tetramethyl(tris(dimethylamino)phosphoranylidene)phosphorictriamid-Et-imin pyrrolidone
[MTBDH ⁺][PhO ⁻]	9-methyl-2,3,4,6,7,8-hexahydropyrimido[1,2-a]pyrimidine phenol
[(P ₂ -Et)H ⁺][PhO ⁻]	Tetramethyl(tris(dimethylamino)phosphoranylidene)phosphorictriamid-Et-imin phenol
[P66614][Pyr]	trihexyl(tetradecyl)phosphonium pyrazole
[P66614][Im]	trihexyl(tetradecyl)phosphonium imidazole
[P66614][Ind]	trihexyl(tetradecyl)phosphonium indole
[P66614][Triz]	trihexyl(tetradecyl)phosphonium Trizole
[P66614][Bentriz]	trihexyl(tetradecyl)phosphonium bentrizole
[P66614][Tetz]	trihexyl(tetradecyl)phosphonium tetrazole
[P66614][Oxa]	trihexyl(tetradecyl)phosphonium oxazolidinone
[P66614][PhO]	trihexyl(tetradecyl)phosphonium phenol
[emim][pivalate]	1-ethyl-3-methylimidazolium pivalate
[emim][lactate]	1-ethyl-3-methylimidazolium lactate
[emim][benzoate]	1-ethyl-3-methylimidazolium benzoate