



# Amine-Based Solvents and Additives to Improve the CO<sub>2</sub> Capture Processes: A Review

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## Supplementary Materials (Amine-Based Solvents and Additive Classification)

**Table S1.** Alkanolamine family.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
AMP	2-amino-2-methyl-1-propanol	124-68-5	Thermodynamic	[85,121–126]
AMPD	2-amino-2-methyl-1,3-propanediol	115-69-5	Thermodynamic	[121]
AEDP	2-amino-2-ethyl-1,3-propanediol	115-70-8	Thermodynamic	[121,124]
THAM	tri(hydroxymethyl)aminomethane	77-86-1	Thermodynamic	[121,127]
MEA	monoethanolamine	141-43-5	Base Compound	[78,85,96,122–126,128–134]
DEEA	diethylethanolamine	100-37-8	Kinetic	[59,60,87,108,134–138]
AEEA	2-(2-aminoethyl-amino)ethanol	111-41-1	Thermodynamic	[122,126,131,136]
AEP	1,3-Diamino-2-propanol	616-29-5	Thermodynamic	[122]
DMEA	2-(dimethylamino)ethanol	108-01-0	Kinetic	[59,60,108,126,137]
DMA-1P	3-dimethylamino-1-propanol	3179-63-3	Kinetic	[59,60]
DEA-1P	3-diethylamino-1-propanol	622-93-5	Kinetic	[59,60]
DMA-2P	1-dimethylamino-2-propanol	108-16-7	Kinetic	[59,60]
DEA-2P	1-diethylamino-2-propanol	4402-32-8	Kinetic	[59,60]
DIPAE	2-(diisopropylamino)ethanol	96-80-0	Thermodynamic	[59]
DMA-2M-1P	2-(dimethylamino)-2-methyl-1-propanol	7005-47-2	Thermodynamic	[59,60]
DMA-2,2-DM-1P	3-dimethylamino-2,2-dimethyl-1-propanol	19059-68-8	Thermodynamic	[59]
4EMA-2B	4-ethyl-methyl-amino-2-butanol	26734-08-7	Thermodynamic	[59]
EDEA	N-ethyldiethanolamine	139-87-7	Thermodynamic	[59,135]
IPDEA	N-isopropyldiethanolamine	In lab	Thermodynamic	[59,123]
tBDEA	N-tert-butyldiethanolamine	2160-93-2	Kinetic	[59]
DMA-1,2-PD	3-(dimethylamino)-1,2-propanediol	623-57-4	Thermodynamic	[59,60]
DEA-1,2-PD	3-diethylamino-1,2-propanediol	621-56-7	Thermodynamic	[59,60]
TEA	triethanolamine	102-71-6	Base Compound	[59,139]

<b>MDEA</b>	N-methyldiethanolamine	105-59-9	Base Compound	[59,60,78,85,88,96,123,124,126,129,137,139–145]
<b>DEAB</b>	4-(diethylamino)butan-2-ol	5467-48-1	Thermodynamic	[60]
<b>DEA</b>	diethanolamine	111-42-2	Thermodynamic	[78,96,123,124,126,131,145]
<b>MAMP</b>	2-N-methylamino-2-methyl-1-propanol	In lab	Kinetic	[123]
<b>EAMP</b>	2-N-ethylamino-2-methyl-1-propanol	In lab	Kinetic	[123]
<b>IPAE</b>	2-(isopropylamino)ethanol	In lab	Kinetic	[123]
<b>IBAE</b>	2-(isobutylamino)ethanol	In lab	Kinetic	[123]
<b>SBAE</b>	2-(secondarybutylamino)ethanol	In lab	Kinetic	[123]
<b>MMEA</b>	2-(Methylamino)ethanol	109-83-1	Kinetic	[124,126]
<b>NBMEA</b>	mono-n-Butyl Ethanolamine	111-75-1	Kinetic	[124]
<b>TBMEA</b>	t-butylmonoethanolamine	4620-70-6	Kinetic	[124]
<b>EMEA</b>	ethylmonoethanolamine	110-73-6	Kinetic	[124,135]
<b>DIPA</b>	diisopropanolamine	110-97-4	Kinetic	[124]
<b>AMPDI</b>	2-amino-2-methyl-1,3-propanediol	204-100-7	Kinetic	[124]
<b>MAPA</b>	3-methyl-amino-propyl-amine	6291-84-5	Thermodynamic	[87,129]
<b>TEPA</b>	tetraethylenepentamine	112-57-2	Thermodynamic	[129]
<b>DGA</b>	glycolamine	929-06-6	Kinetic	[85]
<b>TIPA</b>	triisopropanolamine	122-20-3	Kinetic	[137,139]
<b>triMEDA</b>	N,N,N'-Trimethylethylenediamine	142-25-6	Kinetic	[126]

**Table S2.** Heterocyclic amines.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
<b>PZ</b>	piperazine	110-85-0	Both	[78,85,122,124,131,146,147]
<b>NMP</b>	N-Methyl-2-pyrrolidone	872-50-4	Base Compound	[146,148]
<b>IMI</b>	imidazole	288-32-4	Both	[146]
<b>4-A1MPD</b>	4-amino-1-methylpiperidine	41838-46-4	Kinetic	[134]
<b>1-(2HE)PRLD</b>	1-(2-hydroxyethyl)pyrrolidine	2955-88-6	Kinetic	[59]
<b>PRLD-1,2-PD</b>	3-pyrrolidino-1,2-propanediol	85391-19-1	Thermodynamic	[59]
<b>1-(2HE)PP</b>	1-(2-hydroxyethyl)piperidine	3040-44-6	Kinetic	[59]
<b>3PP-1,2-PD</b>	3-piperidino-1,2-propanediol	4847-93-2	Kinetic	[59]
<b>1M-2PPE</b>	1-methyl-2-piperidineethanol	in lab	Kinetic	[59,123]
<b>3H-1MPP</b>	3-hydroxy-1-methylpiperidine	3554-74-3	Thermodynamic	[59]
<b>1E-3HPP</b>	1-ethyl-3-hydroxypiperidine	13444-24-1	Thermodynamic	[59]
<b>AEPI</b>	N-(2-aminoethyl) piperazine	140-31-8	Kinetic	[88,143,149]
<b>BTA</b>	benzotriazole	95-14-7	Thermodynamic	[140]
<b>H</b>	histamine	51-45-6	(-)	[149]
<b>SRT</b>	serotonin	50-67-9	(-)	[149]
<b>2-PMA</b>	2-Pyridyl-methylamine	3731-51-9	(-)	[149]
<b>2-2-AEP</b>	2-(2-Aminoethyl)pyridine	2706-56-1	(-)	[149]
<b>4-2-AEM</b>	4-(2-Aminoethyl)-morpholine	2038-03-1	(-)	[149]
<b>NFM</b>	N-Formylmorpholine	4394-85-8	Kinetic	[148]
<b>PYR</b>	pyrrolidine	123-75-1	Thermodynamic	[139]
<b>DMP</b>	N,N'-Dimethylpiperazine	106-58-1	Kinetic	[126]

**Table S3.** Amino acids.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
<b>Arg</b>	Arginine	74-79-3	Thermodynamic	[142,150]
<b>L-His</b>	L-Histidine	71-00-1	(-)	[149]
<b>D-His</b>	D-Histidine	351-50-8	(-)	[149]
<b>L-Phe</b>	L-Phenylalanine	63-91-2	(-)	[149]
<b>D-Phe</b>	D-Phenylalanine	673-06-3	(-)	[149]
<b>L-DOPA</b>	L-Levodopa	59-92-7	(-)	[149]
<b>D-DOPA</b>	D-Levodopa	5796-17-8	(-)	[149]
<b>L-Trp</b>	L-Tryptophan	73-22-3	(-)	[149]
<b>D-Trp</b>	D-Tryptophan	153-94-6	(-)	[149]
<b>L-Tyr</b>	L-Tyrosine	60-18-4	(-)	[149]
<b>D-Tyr</b>	D-Tyrosine	556-02-5	(-)	[149]
<b>4-A-L-Phe</b>	4-amino-L-Phenylalanine	2410-24-4	(-)	[149]

**Table S4.** Amine family.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
<b>BEHA</b>	bis(2-ethylhexyl)amine	106-20-7	Kinetic	[78]
<b>N,N-DM13PDA</b>	N,N-dimethyl-1,3-propanediamine	111-33-1	Kinetic	[134]
<b>N,N- DM12EDA</b>	N,N-dimethyl-1,2-ethanediamine	110-70-3	Kinetic	[126,134]
<b>TMEDA</b>	N,N,N',N'-tetramethyl-1,2-ethanediamine	110-18-9	Kinetic	[110,126]
<b>TMPDA</b>	N,N,N',N'- tetramethyl-1,3-propanediamine	110-95-2	Kinetic	[110]
<b>TMBDA</b>	N,N,N',N'-tetramethyl-1,4-butanediamine	111-51-3	Kinetic	[110]
<b>EDA</b>	ethylenediamine	107-15-3	Thermodynamic	[43,78,135]
<b>DETA</b>	diethylenetriamine	111-40-0	Thermodynamic	[129,141]
<b>TETA</b>	triethylenetetramine	112-24-3	Kinetic	[88,129,141]
<b>TELA</b>	Triethylamine	121-44-8	Thermodynamic	[78,85]

**Table S5.** Ionic liquids.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
[EMIM]BF <sub>4</sub>	1-butyl-3-methylimidazolium hexafluorophosphate	143314-16-3	Both	[71]
[EtOHMim][PF <sub>6</sub> ]		444723-80-2	Thermodynamic	[151]
[EtOHMim][BF <sub>4</sub> ]		374564-83-7	Thermodynamic	[151]
[EtOHMim]Cl		61755-34-8	Thermodynamic	[151]
[Choline][PF <sub>6</sub> ]		1040887-91-9	Thermodynamic	[151]
[Choline][BF <sub>4</sub> ]		152218-75-2	Thermodynamic	[151]
[Choline]Cl		67-48-1	Thermodynamic	[151]
2-PHEN	2-Fluorophenol	367-12-4	Thermodynamic	[152]
3-PHEN	3-Fluorophenol	372-20-3	Thermodynamic	[152]
4-PHEN	4-Fluorophenol	371-41-5	Thermodynamic	[152]

**Table S6.** Organic salts.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
TBAB	tetrabutylammonium bromide	1643-19-2	Thermodynamic	[71,153,154]
TBAF	tetrabutylammonium fluoride	429-41-4	Thermodynamic	[155]
TBAC	tetrabutylammonium chloride	1112-67-0	Thermodynamic	[153]
TBPB	tetrabutylphosphonium bromide	3115-68-2	Thermodynamic	[152,153]
TBPC	tetrabutylphosphonium chloride	2304-30-5	Thermodynamic	[153]

**Table S7.** Chemical compounds with other functional groups.

Abbreviation Name	Full Name	CAS Reg. No.	Improvement	References
<b>Alcohols</b>				
TEG	triethylene glycol	112-27-6	(-)	[146]
MeOH	methanol	67-56-1	Thermodynamic	[131,156]
PHEN	phenol	108-95-2	Thermodynamic	[152]
<b>Antifoam Emulsions</b>				
	SAG 7133		Thermodynamic	[140]
	VP 5371		Thermodynamic	[140]
<b>Catecholamines</b>				
DA	dopamine	62-31-7	(-)	[149]
ADR	L-adrenaline	51-43-4	(-)	[149]
<b>Cyclic Esters</b>				
PC	propylene carbonate	108-32-7	Both	[71,148]
<b>Cyclic Ethers</b>				
PEGDME	poly(ethylene glycol) dimethyl ether	24991-55-7	Kinetic	[148]
THF	tetrahydrofuran	109-99-9	Thermodynamic	[153,154]
<b>Corrosion inhibitors</b>				
	CRO27005		Thermodynamic	[140]
<b>Inorganic Compounds</b>				
AM	ammonia	1336-21-6	Base Compound	[121,151]
<b>Resines</b>				
	Amberlite IRA-402	52439-77-7	Both	[108]
<b>Surfactants</b>				
SDBS	sodium dodecyl benzene sulfonate	25155-30-0	Both	[71]
<b>Thiophene</b>				
SUF	sulfolane	126-33-0	Both	[146,148]

(-): Compound proposed to improve the capture process without experimental tests or lack of information.