Low transition temperature mixtures (LTTMs) for CO2 capture: suitable alternatives to ionic liquids (ILs)?

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Low Transition Temperature Mixtures (LTTMs) for CO_2 capture: suitable alternative to Ionic Liquids (ILs)?

María Francisco [a,b] *, Lawien Zubeir [a], Adriaan van den Bruinhorst [a], Cor J. Peters [b,c], Maaike C. Kroon [a].

[a] *Eindhoven University of Technology, Eindhoven, Netherlands, 5612 AZ*
[b] *Delft University of Technology, Delft, Netherlands, 2628 CA*
[c] *The Petroleum Institute, Abu Dhabi, U.A.E.*
**Corresponding author: M.Francisco-Casal@tue.nl*

Recently, new approaches were taken towards the use of green solvents. Some examples are the substitution of organic solvents for supercritical fluids,"bio-solvents" or low-vapor-pressure liquids.

Among these possibilities, ionic liquds (Ils) attracted particular attention over the past years. One of their main advantages is that they can be designed by choosing the cation-anion combination to pursuit the best performance as solvents for a certain purpose [1]. The so-called "Task Specific Ionic Liquids"[2] provide more suitable physicochemical properties or high degree of control of the solubility of gases in the solvent media. Together with their extremely low volatility, the juidicious selection of the constituents contributes to their "green" performance . However, their "green" character is sometimes questioned. The high viscosity, production and purification cost make ILs technology in most of the cases not competitive compared with traditional solvents.

More recently, deep eutectic solvents formed by combination of a quaternary salt and a hydrogen-bond donor showed IL analogue solvent characteristics, with promising advantages. Some of them are low cost preparation, no need of purification, no water incompatibility, tunable phase behavior and solubility, low toxicity and biodegradability [3]. A new family of low transition temperature mixtures (LTTMs) formed by natural molecules keeping the functionalities of some task specific and natural ionic liquids[4] is explored in this work, evaluating their suitablility as solvents for CO_2 capture.

References

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