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ENERGY PERFORMANCE OF CARBON CAPTURE WITH IONIC LIQUIDS

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Abstract *Carbon Capture (CC) would be an interim solution for the stabilization of the anthropogenic CO_2 emissions due to the use of fossil fuels, but also a long-term solution for the re-use of Carbon in bio-mimicry processes. Nowadays, many processes are available for the sequestration of CO_2 from gaseous streams. However, CC still requires less energy-intensive processes. Ionic Liquids (ILs) are salts that melt below 100°C and that have been widely studied as sorbents for CC. Recently, bio-inspired ILs that rely on choline and amino-acids were investigated as an alternative to common amine-scrubbing process. The reversible chemisorption through amino-acids and the exploitation of low-toxicity bio-molecules obtained from renewable feedstock make this class of ILs a promising solution for a fully sustainable CC process. The main properties of amino-acid-based ILs, mass- and molar-based capture efficiency and the benefits of dilution in dimethyl sulfoxide (DMSO) on viscosity, were studied. We used experimental data for tuning the CC thermodynamic models. Future experiments will be performed in a prototypal two-column experimental rig at CO_2 Circle Lab of the Environment Park of Torino (Italy). Finally, this work aims at assessing the energy performance of CC based on ILs and comparing it to that of more established CC techniques (e.g., amine scrubbing, Direct Air Capture).*