



POLITECNICO DI TORINO
Repository ISTITUZIONALE

Energy performance of carbon capture with ionic liquids

Original

Energy performance of carbon capture with ionic liquids / Buffo, Giulio; Latini, Giulio; Bocchini, Sergio; Lanzini, Andrea; Santarelli, Massimo; Pirri, Candido. - (2019), pp. 48-48. ((Intervento presentato al convegno 4th Energy for Sustainability International Conference - Designing a Sustainable Future (EFS 2019) tenutosi a Torino (IT) nel 24-26 luglio 2019.

Availability:

This version is available at: 11583/2759859 since: 2019-10-10T18:45:20Z

Publisher:

Itecons - Instituto de Investigação e Desenvolvimento Tecnológico para a Construção, Energia, Ambiente

Published

DOI:

Terms of use:

openAccess

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

ENERGY PERFORMANCE OF CARBON CAPTURE WITH IONIC LIQUIDS

Giulio Buffo^{1*}, Giulio Latini^{2,3}, Sergio Bocchini³, Andrea Lanzini¹, Massimo Santarelli¹ and Candido Fabrizio Pirri^{2,3}

1: Dipartimento Energia (DENERG)
Politecnico di Torino
Corso Duca degli Abruzzi 24 – 10129 Torino (Italy)
e-mail: giulio.buffo@polito.it, web: <http://www.steps.polito.it>

2: Dipartimento di Scienza Applicata e Tecnologia (DISAT)
Politecnico di Torino
Corso Duca degli Abruzzi 24 – 10129 Torino (Italy)
e-mail: giulio.latini@polito.it, web: <http://disat.polito.it/it/>

3: Centre for Sustainable Future Technologies (CSFT)
Istituto Italiano di Tecnologia (IIT)
Via Livorno 60 – 10144 Torino (Italy)
e-mail: giulio.latini@iit.it, web: <https://www.iit.it/it/centers/csft-polito>

Keywords: Carbon capture, Experimental characterization, Process modeling, Energy analysis, Ionic liquids

Abstract *Carbon Capture (CC) would be an interim solution for the stabilization of the anthropogenic CO₂ 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 CO₂ 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 CO₂ 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).*