IONIC LIQUIDS FOR CAPTURE AND ELECTROCHEMICAL CONVERSION OF CO2 - CIS 2021

IONIC LIQUIDS FOR CAPT
ELECTROCHEMICAL CONVE

Alessia Fortunati[1,], María José Rubio[1], Boyan Iliev[2], Thomas Schubert[2],*

[1] Department of Applied Science and Technology, Politecnico di Torino, Corso Du

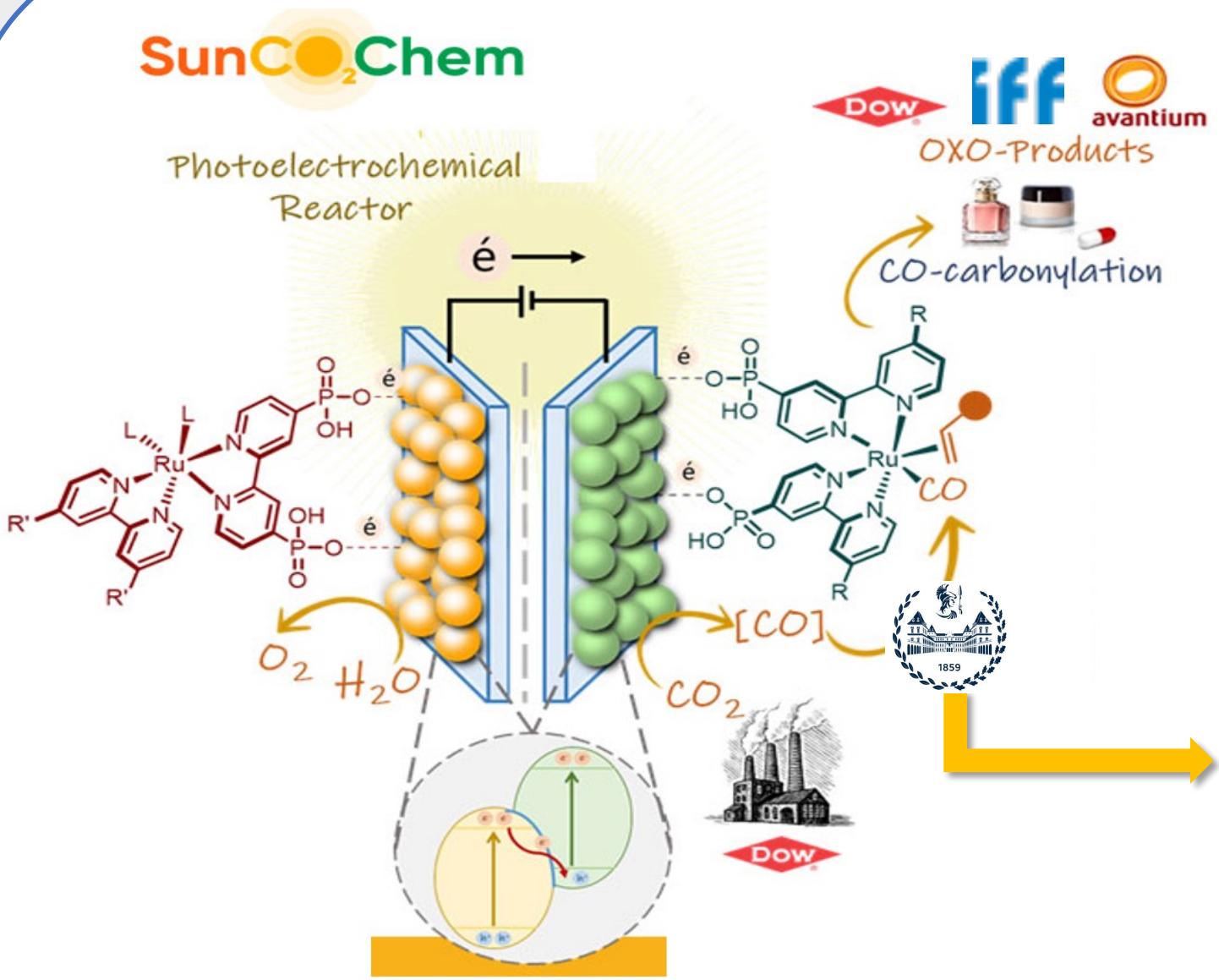
[2] Iolitec Ionic Liquids technologies GMBH, Salzstraße 184, 7407

**Email addresses: alessia.fortunati@polito.it; simely*

CIS-2021 Young Researchers

Short Talk ID:
Section 9: CO

Introduction and aim of the work



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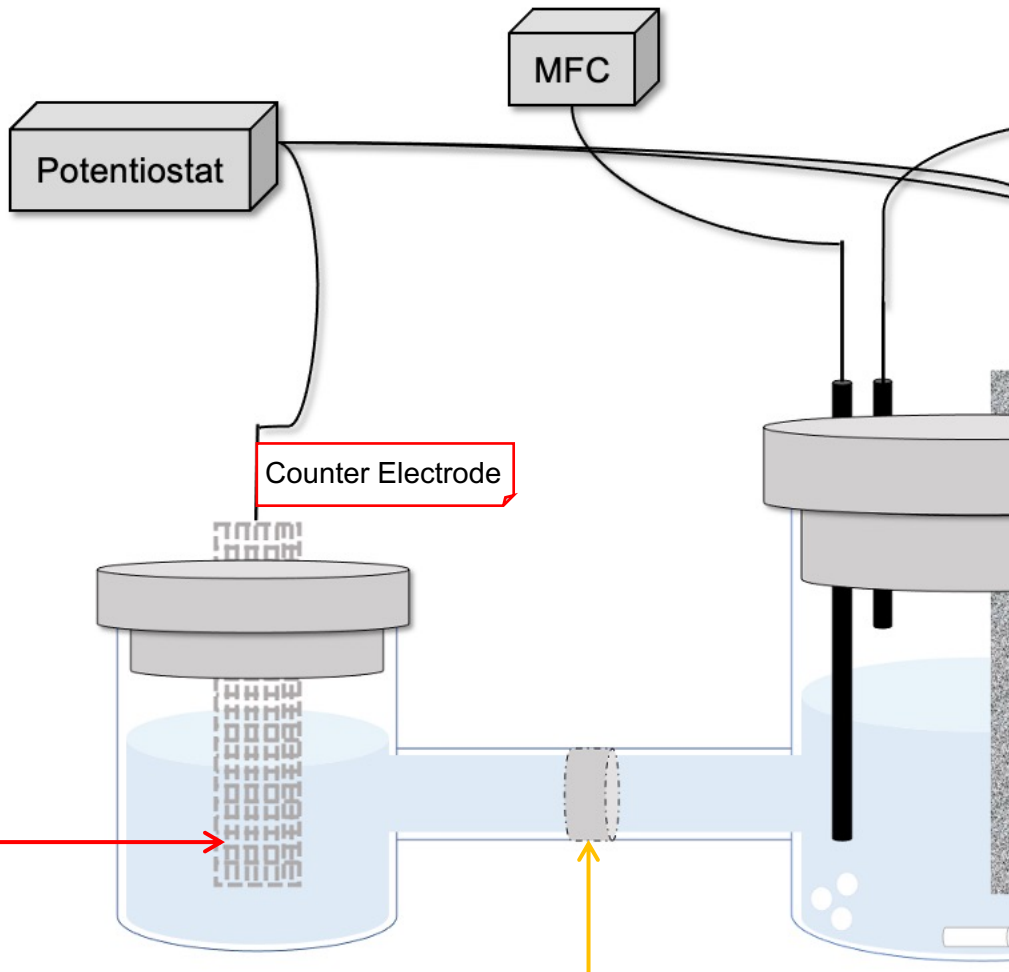
[1] Wang, Y. et al, (2015), Physical Chemistry Chemical Physics, 17(36) [2] S. Hernandez et al, Green Chem., 2017, DOI:10.109/C7GC00398F [3] DO

Materials and methods

Anolyte: 0,1M KOH aqueous solution.

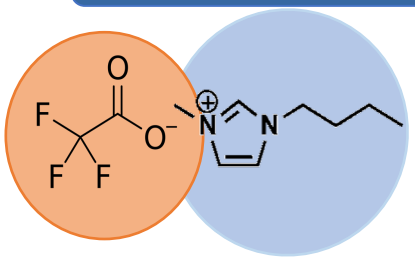
Anode: **Ni mesh**



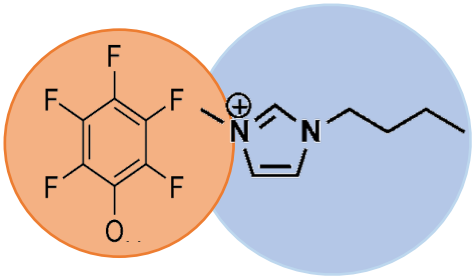
Transparent Bipolar membrane (**TBM**) pr
the mixing of the anolyte and catholyte sol

H-type cell configuration

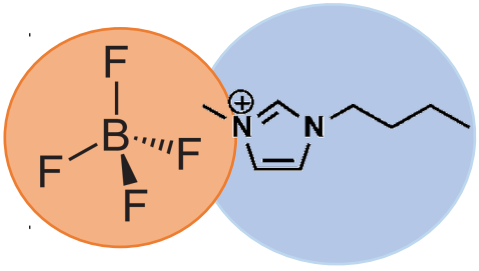
Results and discussion



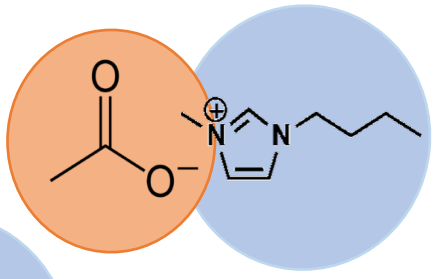
[BMIM][CO_2CF_3]



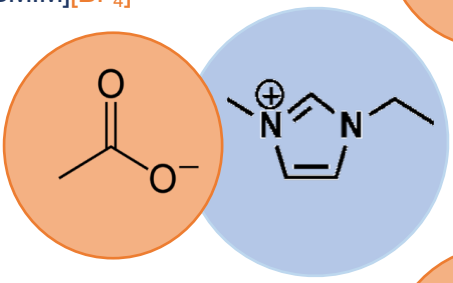
[BMIM][5FF]



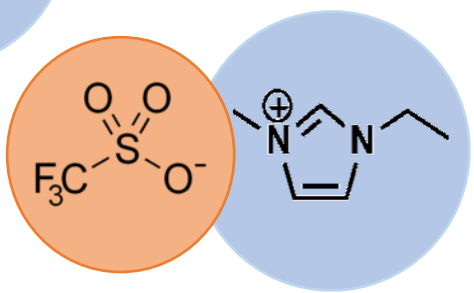
[BMIM][BF_4]



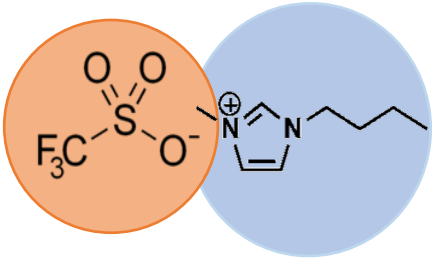
[BMIM][CO_2CH_3]



[EMIM][CO_2CH_3]



[EMIM][SO_3CF_3]



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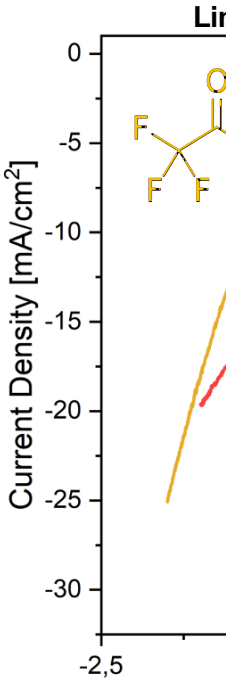
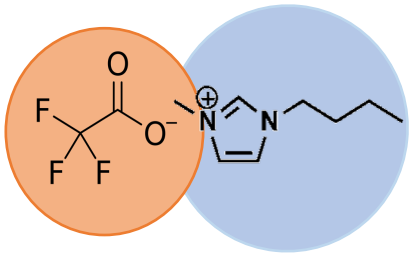


- **CO_2 solubility** s
- A higher fluorinat
  CO_2 solubility an
- It might be relate

[4] Dębski, B. et al (2019), Journal of Molecular Liquids, 29

Results and discussion



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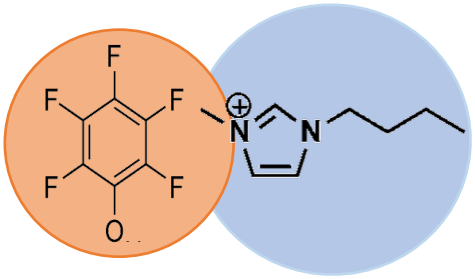

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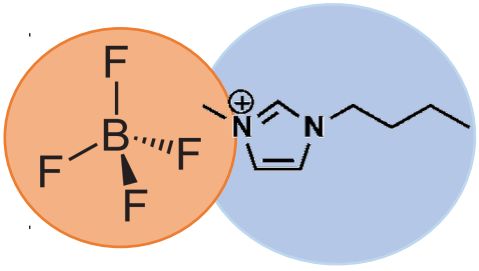

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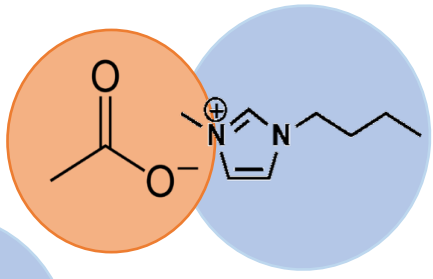

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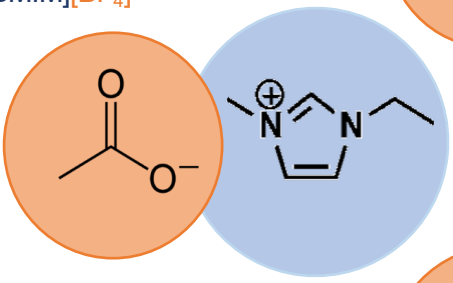

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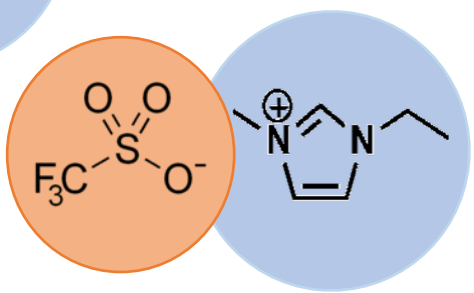

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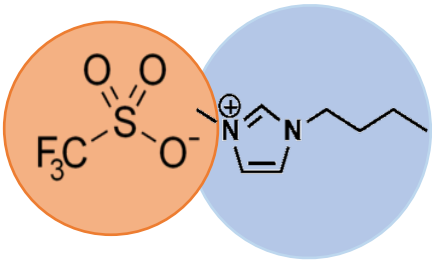

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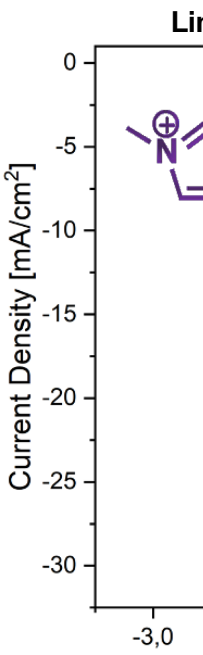
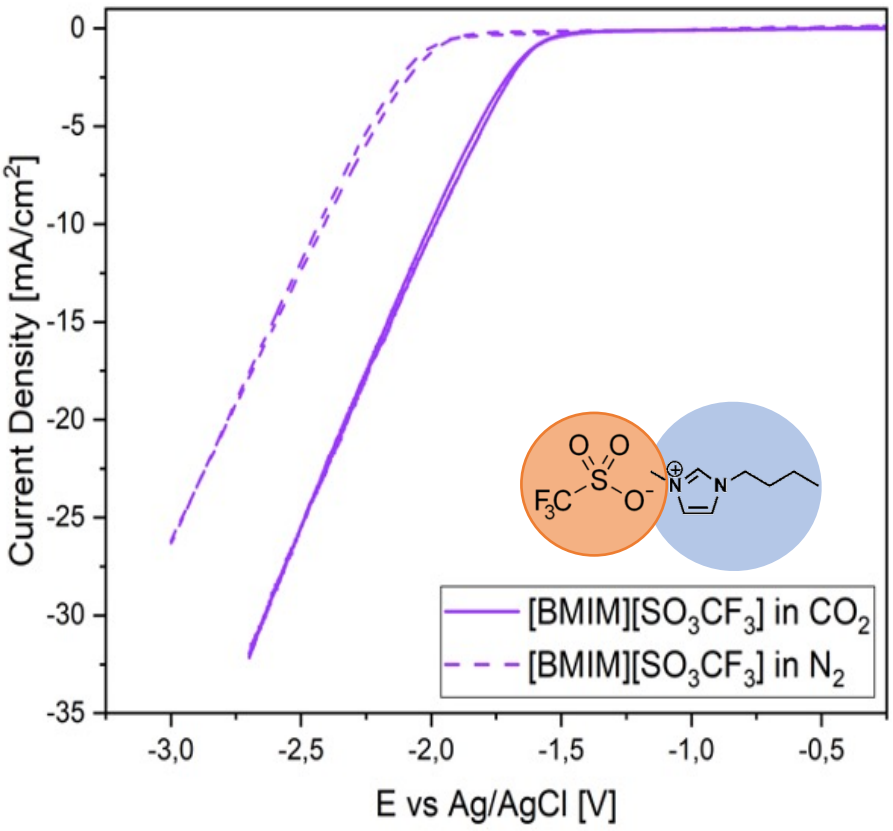


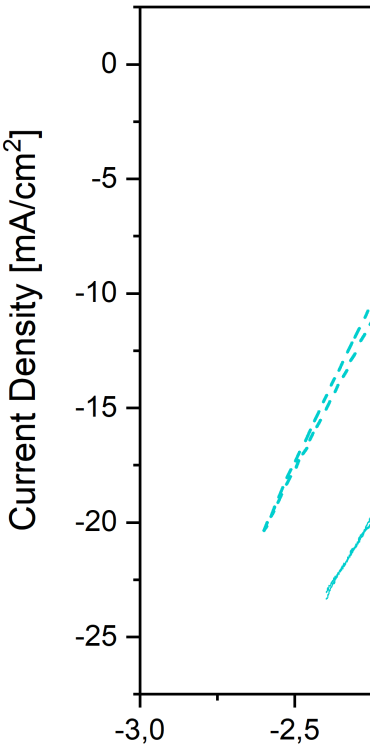
- The alkyl chain c
- When the **alky** ring finds a **mor** to reduce and dioxide molecule negative onset p

[5] Lockett, V. et al, (2008), Journal of Physical Chemistry C, 112(19), 7486–7495

Results and discussion

Cyclic Voltammetry (CV)

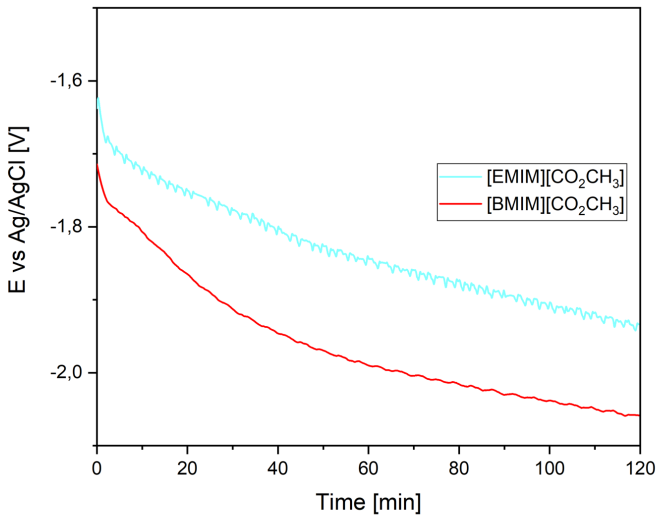


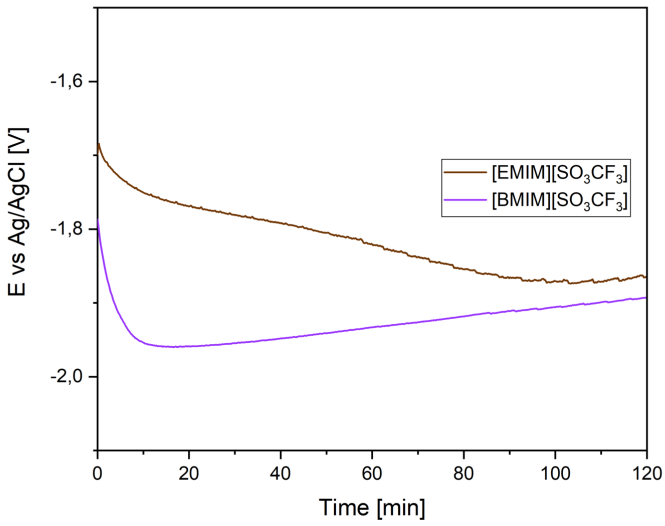


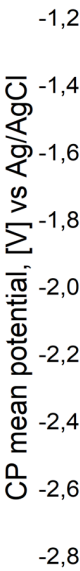
✓ ***CVs' highlights:*** Onset potential of all the ILs is shifted to less negative po
with CO_2.

Results and discussion

Chronopotentiometry (CP) in CO_2, t=120 min, -20 mA







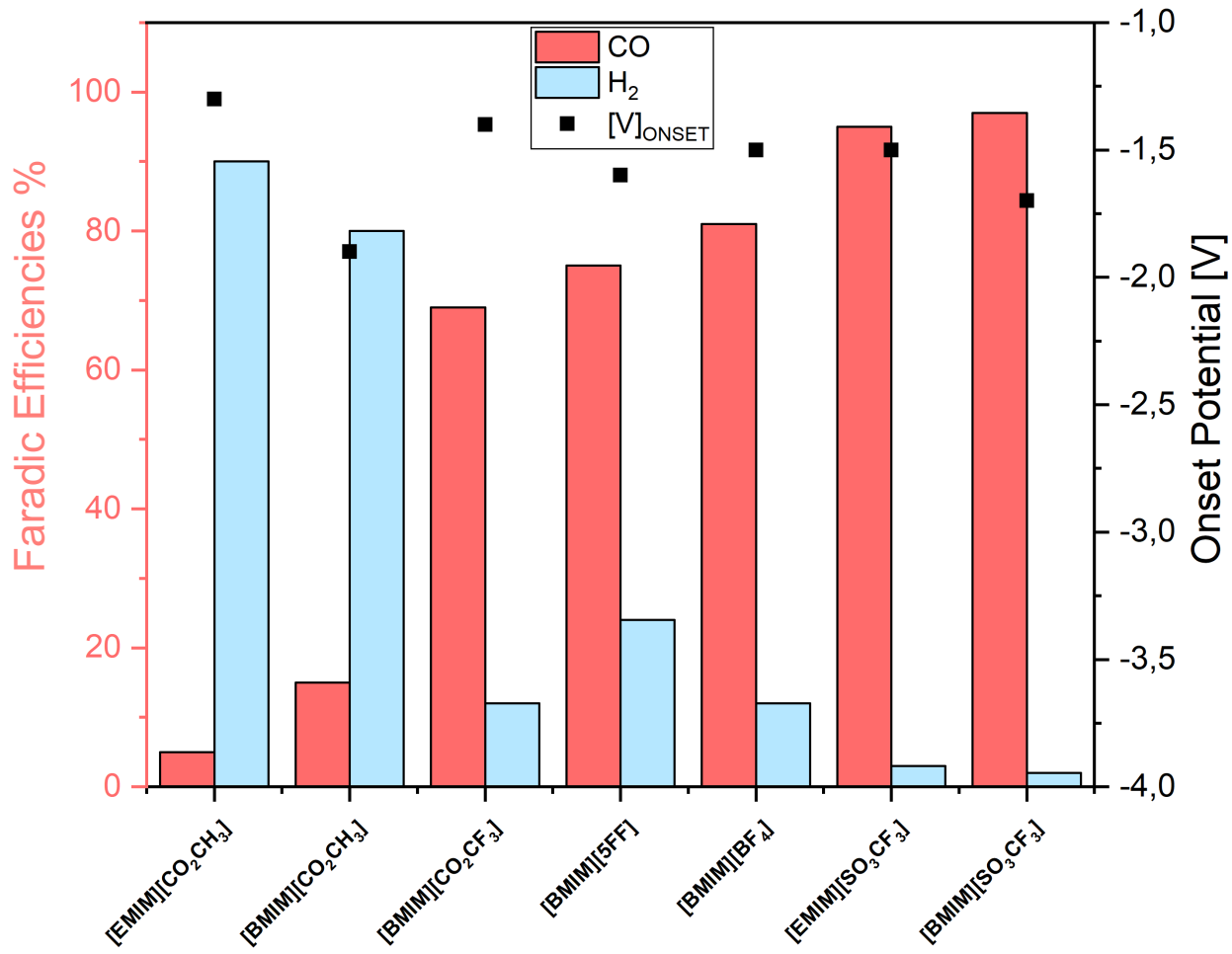
✓ ***CP's highlights:*** comparing the CP's curves, for the same anion with EM
with BMIM. Probably this trend is due to two aspects:

1- A more convenient orientation reached by a shorter cation alkyl chain on t

2- It can be linked to the conductivity of the catholyte. Catholyte conductivitie
[EMIM][SO_3CF_3] solutions are higher than [BMIM][CO_2CH_3] and [BMIM][S

Results and discussion

Chronopotentiometry (CP) in CO_2, t=120 min, -20 mA



✓ ***[V]o***

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✓ ***Selec***

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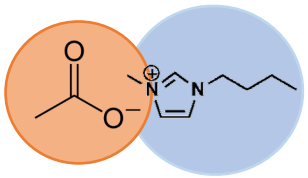
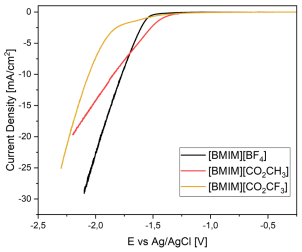
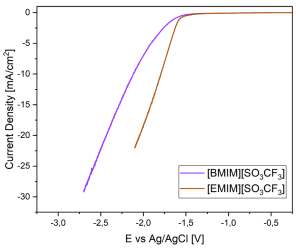
Conclusions



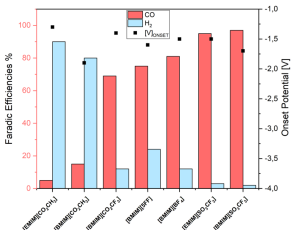
- Seven imidazolium salts were tested for the el CO.



- CO_2 solubility depends on the anion of the imid higher for fluorinated anions.



- The cation has a steric effect and an orienta decreases, the imidazolium ring finds a more co surface.



- Imidazolium salts of acetate are more selectiv [BMIM][SO_3CF_3] promotes the reduction of CO_2 used [BMIM][BF_4]. Reaction mechanisms behind

Acknowledgements

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