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(54) Title: ENHANCED CONVERSION OF CHEMISORBED CO<sub>2</sub> IN AMINE-BASED ELECTROCHEMICAL SYSTEMS

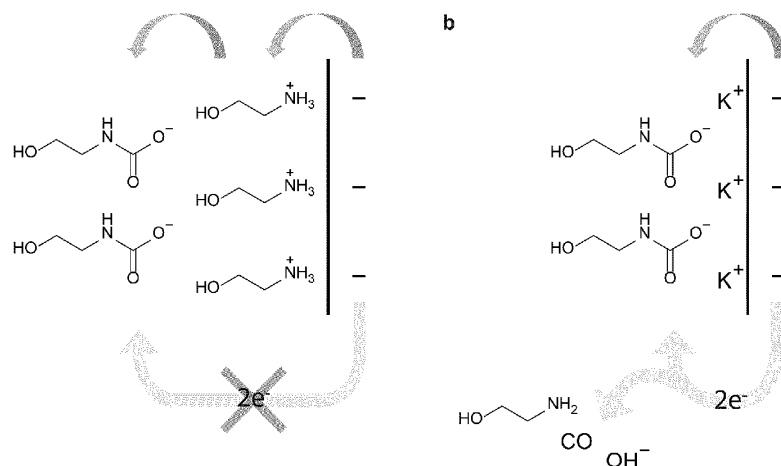


FIG. 2

(57) Abstract: An electrochemical process, and related method and system to upgrade captured CO<sub>2</sub> into value-added products. CO<sub>2</sub> capture technologies based on chemisorption present the potential to lower net emissions of CO<sub>2</sub> into the atmosphere. The use of alkali cations to tailor the electrochemical double layer allows achieving the valorization of chemisorbed CO<sub>2</sub> in an aqueous amine-based electrolyte, by placing the CO<sub>2</sub> of the amine-CO<sub>2</sub> adduct sufficiently close to the site of a heterogeneous reaction at the working electrode. It is revealed, using electrochemical studies and in-situ surface-enhanced Raman spectroscopy, that a smaller double layer distance can correlate with improved activity for CO<sub>2</sub> to CO from amine solutions.

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