

Title (en)
CONTINUOUS CO-CURRENT ELECTROCHEMICAL REDUCTION OF CARBON DIOXIDE

Title (de)
KONTINUIERLICHE ELEKTROCHEMISCHE GLEICHSTROM-REDUKTION VON KOHLENDIOXID

Title (fr)
REDUCTION ELECTROCHIMIQUE DE DIOXYDE DE CARBONE A COURANTS PARALLELES

Publication
EP 1951933 A1 20080806 (EN)

Application
EP 06804642 A 20061013

Priority
• CA 2006001743 W 20061013
• US 72564205 P 20051013

Abstract (en)
[origin: WO2007041872A1] In various embodiments, the invention provides electro-chemical processes for reduction of carbon dioxide, for example converting carbon dioxide to formate salts or formic acid. In selected embodiments, operation of a continuous reactor with a three dimensional cathode and a two-phase (gas/liquid) catholyte flow provides advantageous conditions for electro-reduction of carbon dioxide. In these embodiments, the continuous two-phase flow of catholyte solvent and carbon dioxide containing gas, in selected gas/liquid phase volume flow ratios, provides dynamic conditions that favour the electro-reduction of COs at relatively high effective superficial current densities and gas space velocities, with relatively low reactor (cell) voltages (<10 Volts). In some embodiments, relatively high internal gas hold-up in the cathode chamber (evident in an internal gas to liquid phase volume ratio > 0.1) may provide greater than equilibrium CO₂ concentrations in the liquid phase, also facilitating relatively high effective superficial current densities. In some embodiments, these characteristics may for example be achieved at catholyte pH > 7 and relatively low CO₂ partial pressures (< 10 bar). In some embodiments, these characteristics may for example be achieved under near adiabatic conditions, with catholyte outlet temperature up to about 80 °C.

IPC 8 full level
C25B 3/25 (2021.01); **C25B 9/19** (2021.01)

CPC (source: EP US)
B01D 53/326 (2013.01 - EP US); **C25B 3/25** (2021.01 - EP US); **C25B 9/19** (2021.01 - US); **C25B 9/40** (2021.01 - EP US); **C25B 11/031** (2021.01 - EP US); **C25B 11/04** (2013.01 - US); **C25B 11/044** (2021.01 - US); **C25B 11/051** (2021.01 - US); **C25B 11/075** (2021.01 - US); **C25B 11/091** (2021.01 - US); **C25B 13/08** (2013.01 - US); **C25B 15/02** (2013.01 - EP US); **C25B 15/08** (2013.01 - EP US); **B01D 2257/504** (2013.01 - EP US); **Y02P 20/151** (2015.11 - EP US)

Designated contracting state (EPC)
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR

Designated extension state (EPC)
AL BA HR MK RS

DOCDB simple family (publication)
WO 2007041872 A1 20070419; **WO 2007041872 B1 20070719**; AU 2006301857 A1 20070419; CA 2625656 A1 20070419; CA 2625656 C 20141209; CN 101657568 A 20100224; CN 101657568 B 20130508; EP 1951933 A1 20080806; EP 1951933 A4 20110824; JP 2009511740 A 20090319; US 2008223727 A1 20080918; US 2014299482 A1 20141009; US 2016068974 A1 20160310

DOCDB simple family (application)
CA 2006001743 W 20061013; AU 2006301857 A 20061013; CA 2625656 A 20061013; CN 200680037810 A 20061013; EP 06804642 A 20061013; JP 2008534843 A 20061013; US 201414244869 A 20140403; US 201514851745 A 20150911; US 9005206 A 20061013