Integration of the aprotic CO_2 reduction to oxalate at a Pb catalyst into a GDE flow cell configuration

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current densities <i>i</i> / mA·cm ⁻²	Faradaic Efficiency $FE(C_2O_4^{2-}) / \%$
51	40
10 ¹	60
201	80
401	85
60 ¹	90
80 ¹	90
6 ²	61
11 ³	89
35 ³ *	97
134	31
204	62
20 ⁵	45
10 ⁶	59
157	74
0,28	72
18 ⁹	90
10 ¹⁰	86

Supporting Information

* at -5 °C

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SI 2: Scanning electron microscope images of the cross section of the prepared Pb GDE. Left: Profile of catalyst layer (top) and gas diffusion layer (bottom) Right: Magnification of catalyst layer. Images were recorded with a backscattered electron detector.



SI 3: Ferrocene calibration of Ag/AgNO₃ reference electrode at Pt working electrode. CV was recorded employing two Pt electrodes with the Ag/AgNO₃ reference electrode described in the main text. The CV was recorded at a scan rate of 10 mV·s⁻¹ in a 0.1M tetraethylammonium tetrafluoroborate, 0.02 M ferrocene solution in N₂-purged acetonitrile.



SI 4: Cell Voltages U in V plotted over the reaction time t in min for galvanostatic experiments at current densities between 10-40 mA·cm⁻² recorded in a two-electrode single chamber flow cell employing a Pb working electrode and a Zinc sacrificial anode. For the exact experimental conditions, see main text.



SI 5: Left: Cell Voltages *U* in V plotted over the reaction time *t* in min for galvanostatic experiments at current densities between 20-80 mA·cm⁻² recorded in a two-electrode single chamber flow cell employing a Pb GDE and a Zinc sacrificial anode. For the exact experimental conditions, see main text. Right: Current density program *j* in mA·cm⁻² employed during the 30 min. In the first 5 min of the experiment, the current density was increased in constant 20 mA·cm⁻² steps up to the desired current density.



SI 6: XRD powder diffraction pattern recorded of the solid products formed during the electrochemical reduction of CO_2 to oxalate in the flow cell at a Pb plate. The pattern was recorded using an Empyrean system and employing a Co-tube at 40 mA and 45 kV. A Bragg Brentano HD incident beam module was used with a PIXcel detector, recording the pattern at a scan speed of 0.067335°·s⁻¹.

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