

# Supplementary materials for the paper

## Platinum-Modified Mixed Metal Oxide Electrodes for Efficient Chloralkaline-Based Energy Storage

Jamyllle Y.C. Ribeiro <sup>1,2,3</sup>, Gessica O. S. Santos <sup>3,4</sup>, Aline R. Dória <sup>1,4</sup>, Iñaki Requena <sup>3</sup>, Marcos R. V. Lanza <sup>4</sup>, Katlin I. B. Eguiluz <sup>1,2</sup>, Giancarlo R. Salazar-Banda <sup>1,2</sup>, Justo Lobato <sup>3,\*</sup> and Manuel A. Rodrigo <sup>3,\*</sup>

<sup>1</sup> Electrochemistry and Nanotechnology Laboratory, Institute of Technology and Research (ITP), Aracaju, SE 49032-490, Brazil; jamyllrib@gmail.com (J.Y.C.R.); alinerdoria@gmail.com (A.R.D.); katlinbarrios@gmail.com (K.I.B.E.); gianrsb@gmail.com (G.R.S.-B.)

<sup>2</sup> Graduate Program in Processes Engineering (PEP), Tiradentes University, Aracaju, SE 49032-490, Brazil

<sup>3</sup> Chemical Engineering Department, Faculty of Chemical Sciences and Technologies, Universidad Castilla-La Mancha, 13004 Ciudad Real, Spain; gessicasantiago@usp.br (G.O.S.S.); inaki.requena@uclm.es (I.R.)

<sup>4</sup> São Carlos Institute of Chemistry, University of São Paulo, São Carlos, S.P. 13566-590, Brazil; marcoslanza@usp.br

\* Correspondence: justo.lobato@uclm.es (J.L.); manuel.rodrigo@uclm.es (M.A.R.)

**Table S1.** Main chemicals used in this work.

Reagent	Chemical formula	Supplier	Purity (%)
Hydrochloric acid	HCl	Neon®	38.0
Sulfuric acid	H <sub>2</sub> SO <sub>4</sub>	Scharlau®	97.0
Ruthenium (III) chloride hydrate	RuCl <sub>3</sub> ·xH <sub>2</sub> O	Sigma-Aldrich®	99.5
Antimony (III) chloride	SbCl <sub>3</sub>	Sigma-Aldrich®	99.0
Hexachloroplatinic acid	H <sub>2</sub> PtCl <sub>6</sub> ·6H <sub>2</sub> O	Sigma-Aldrich®	37.5
Oxalic acid	C <sub>2</sub> H <sub>2</sub> O <sub>4</sub>	Sigma-Aldrich®	99.5
Isopropanol	C <sub>3</sub> H <sub>8</sub> O	Sigma-Aldrich®	99.8
Sodium chloride	NaCl	Panreac®	99.5

**Table S2.** Determination of the nominal and experimental proportion of metals in the oxide films.

Electrodes	Nominal composition (mol%)			Experimental composition (mol%) (SEM-EDX)			The atomic ratio of elements (at.%-ICP)		
	Ru	Sb	Pt	Ru	Sb	Pt	Ru	Sb	Pt
Ti/(RuO <sub>2</sub> ) <sub>70</sub> -(Sb <sub>2</sub> O <sub>4</sub> ) <sub>30</sub>	70	30	-	75.5	24.5	-	69.4	30.6	-
Ti/(RuO <sub>2</sub> ) <sub>66.5</sub> -(Sb <sub>2</sub> O <sub>4</sub> ) <sub>28.5</sub> -Pt <sub>5</sub>	66.5	28.5	5	67.0	27.5	5.5	84.9	12.6	2.5
Ti/(RuO <sub>2</sub> ) <sub>63</sub> -(Sb <sub>2</sub> O <sub>4</sub> ) <sub>27</sub> -Pt <sub>10</sub>	63	27	10	66.2	23.6	10.2	60.8	22.7	16.5