

Title	A simulation and experimental study of electrochemical pH control at gold interdigitated electrode arrays
Authors	O'Sullivan, Benjamin;Patella, Bernardo;Daly, Robert;Seymour, Ian;Robinson, Caoimhe;Lovera, Pierre;Rohan, James F.;Inguanta, Rosalinda;O'Riordan, Alan
Publication date	2021-08-22
Original Citation	O'Sullivan, B., Patella, B., Daly, R., Seymour, I., Robinson, C., Lovera, P., Rohan, J., Inguanta, R. and O'Riordan, A. (2021) 'A simulation and experimental study of electrochemical pH control at gold interdigitated electrode arrays', <i>Electrochimica Acta</i> , 395, 139113 (9pp). doi: 10.1016/j.electacta.2021.139113
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1016/j.electacta.2021.139113
Rights	© 2021, Elsevier Ltd. All rights reserved. This manuscript version is made available under the CC BY-NC-ND 4.0 license. - https://creativecommons.org/licenses/by-nc-nd/4.0/
Download date	2026-09-21 16:21:06
Item downloaded from	https://hdl.handle.net/10468/11946



UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Supporting Information for

A Simulation and Experimental Study of Electrochemical pH Control at Gold Interdigitated Microband Arrays

Benjamin O'Sullivan^a, Bernardo Patella^{a,b}, Robert Daly^a, Ian Seymour^{a,c}, Caoimhe Robinson^a, Pierre Lovera^a, James F. Rohan^c, Rosalinda Inguanta^b, Alan O'Riordan^a

^a Nanotechnology Group, Tyndall National Institute, University College Cork, Cork T12 R5CP, Ireland

^b Laboratorio di Chimica Fisica Applicata, Dipartimento di Ingegneria, Università of Palermo, Viale delle Scienze, Palermo, Italy

^c Electrochemical Materials and Energy Group, Tyndall National Institute, University College Cork, Cork T12 R5CP, Ireland

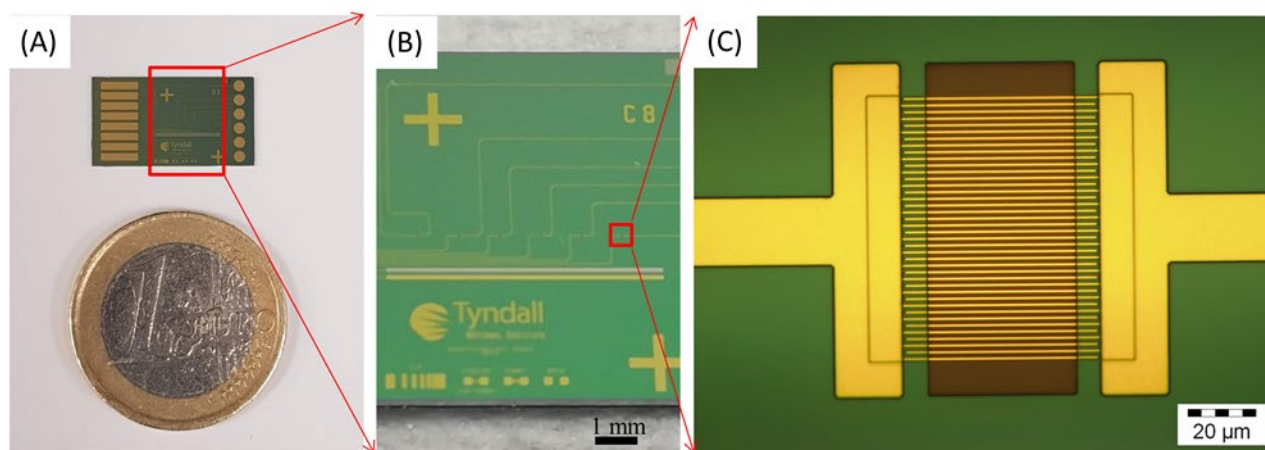


Fig. S1. (A) Image of silicon chip sensor device with euro coin for scale (B) Magnified image of chip showing Pt reference and Au counter electrodes position relative to working electrodes (C) 1 μm array interdigitated microband working electrode passivation window.

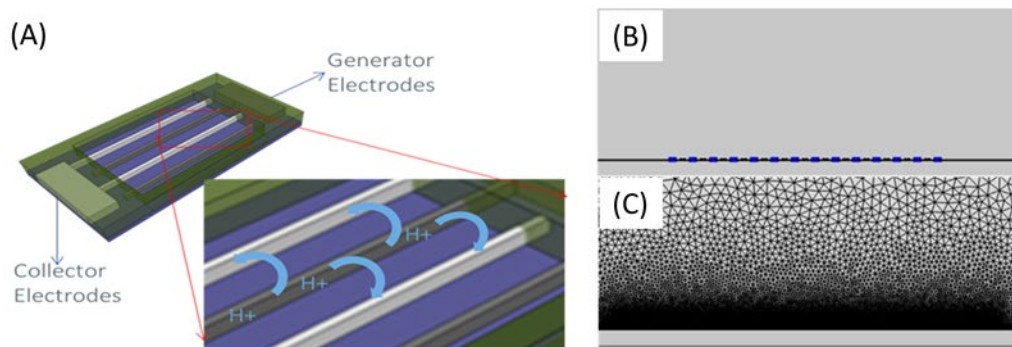


Fig. S2. (A) Schematic of an interdigitated array (B) Image of 2 μm gap array rendered in Comsol (C) Meshing of domain near electrodes in Comsol.

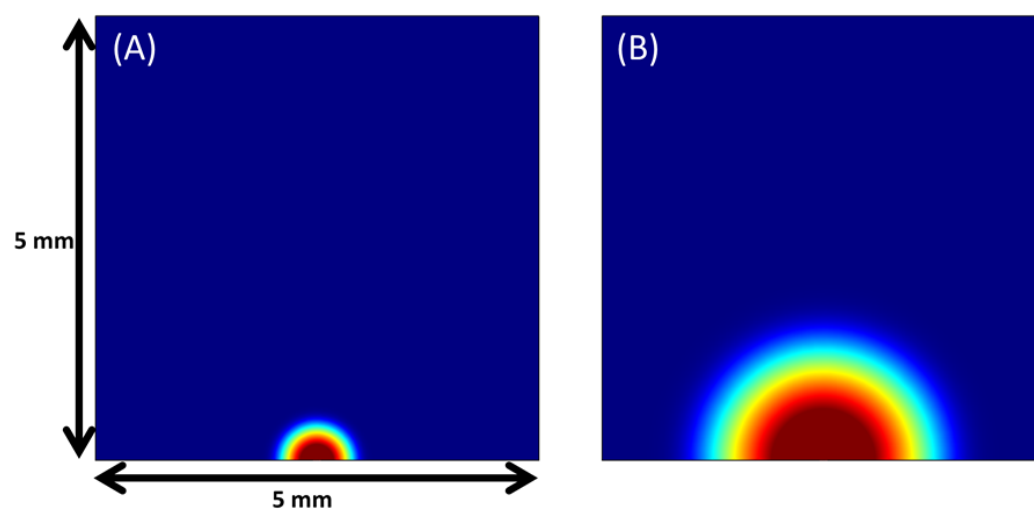


Fig. S3. (A) Simulated pH profile after 1 second with applied current of 100 nA in unbuffered solution (B) Simulated pH profile after 10 seconds with applied current of 100 nA in unbuffered solution.

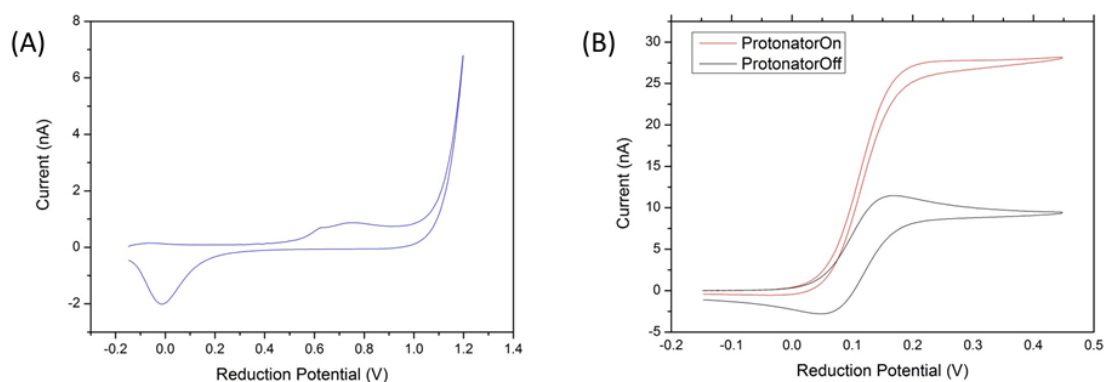


Fig. S4. Example CV at array with gold oxide formation and reduction peak (B) Example CV of FcCOOH with protonator held at -0.15 V (on) or not used (off).

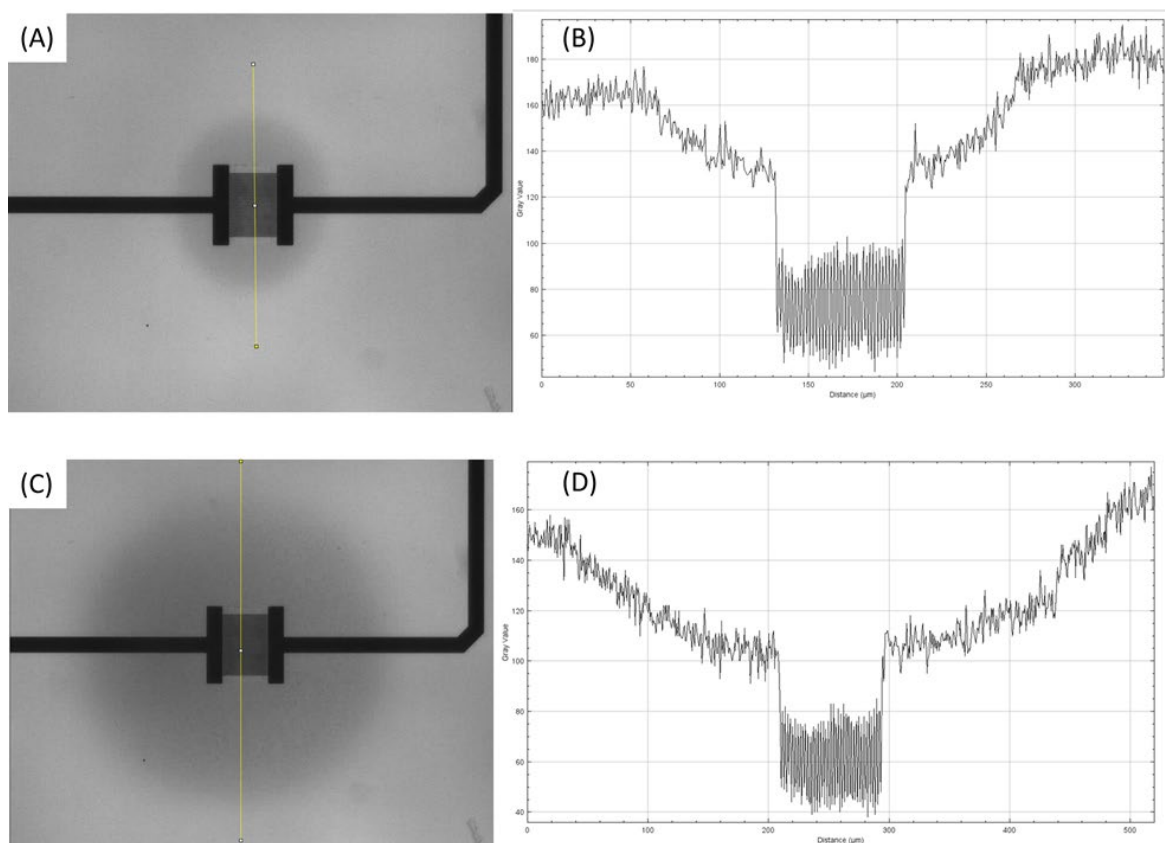


Fig. S5. ImageJ analysis of pH change visualisation (section 4.7). Grayscale image of “1 second” data (A) and profile plot of intensity across electrode versus distance (B). Grayscale image of “10 second” data (C) and profile plot of intensity across electrode versus distance (D).