Supporting Information

Oil Immersion-Scanning Micropipette Contact Method Enabling Long-term Corrosion Mapping

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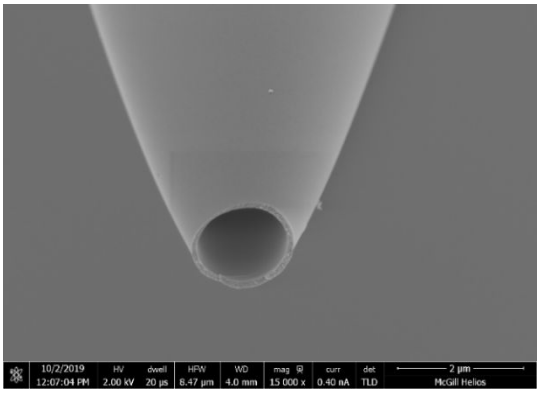

Figure S1. SEM image of the micropipette (diameter: ~1.65 µm).

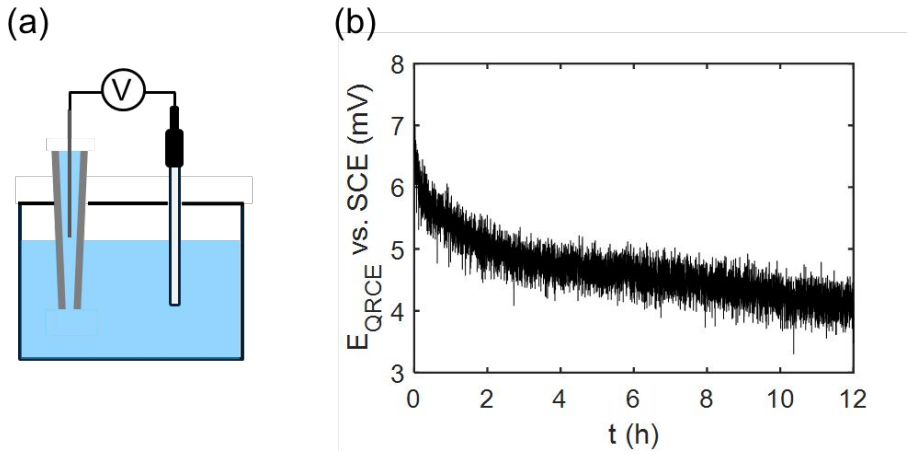

Figure S2. (a) Schematic of the setup used to measure the potential of the Ag/AgCl wire QRCE vs. saturated calomel electrode (SCE) in 3.5 wt% NaCl electrolyte solution based on open circuit potential (OCP) measurement. (b) The potential of a freshly prepared Ag/AgCl QRCE was monitored over 12 h. Only a small shift (~2.5 mV) was observed.

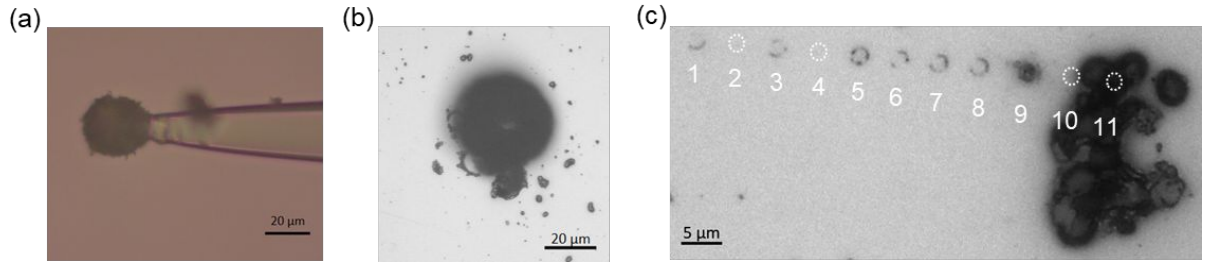

Figure S3. (a) NaCl crystal formed at the end of a broken micropipette used in SMCM conducted in air. (b) The micropipette crashed, leaving electrolyte on the surface. (c) After removing the electrolyte from the surface using water, the corrosion

spots were exposed. The white dashed circles represent the locations where the droplet did not land because of the interference of external noise.

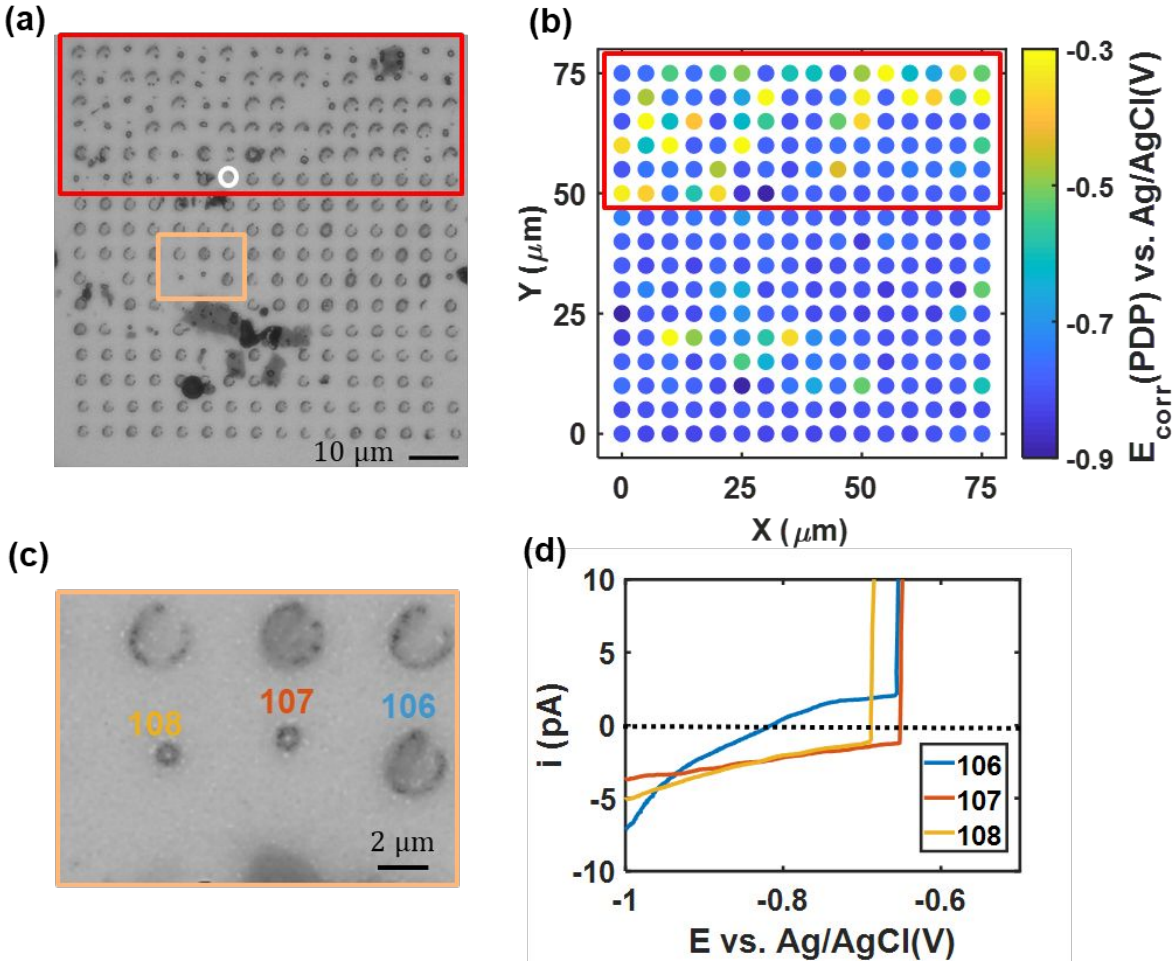

Figure S4. SMCM experiment in a humidified cell**.** (a) Optical micrograph of a 75 x 75 µm^2 scanned area (16x16, 256 landings) and (b) the corresponding E_{corr} (PDP) map. PDP measurements were performed at 100 mV/s after a wait time of 30 s at each landing point. The red box marks the area scanned following the breakage of the micropipette. This breakage is thought to have happened at landing 170 marked by the white circle, as points following the 169th landing (right side of the white circle), showed abnormalities in both their footprints on the sample surface and their E_{corr}(OCP) values. (c) Amplified image of the area in the orange box in (a). (d) The PDP curves (averaged smoothed every 30 data points) at three points 106, 107, 108.

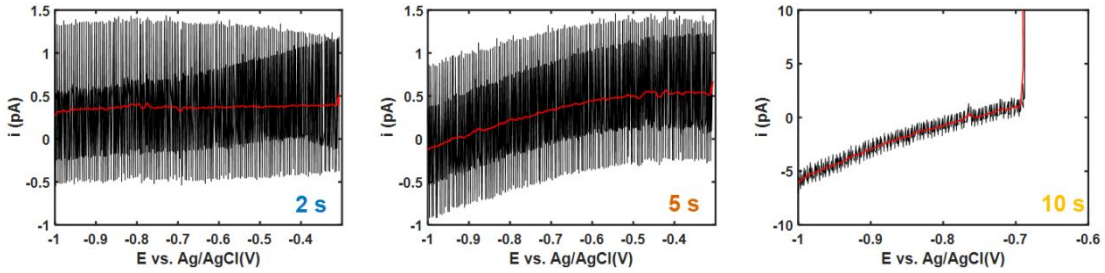

Figure S5. The raw data (black) were collected in the polarization measurements in Figure 4e and smoothed (red) using the 30-point moving averaging method.

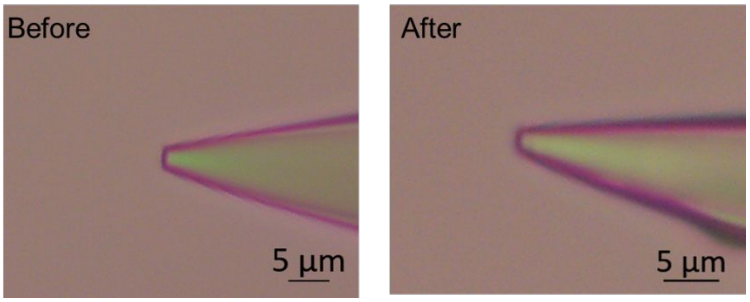

Figure S6. The optical microscopic images of the micropipette before and after landing 961 times during a ~ 20 h OI-SMCM experiment whose results are presented in Figure 5a.

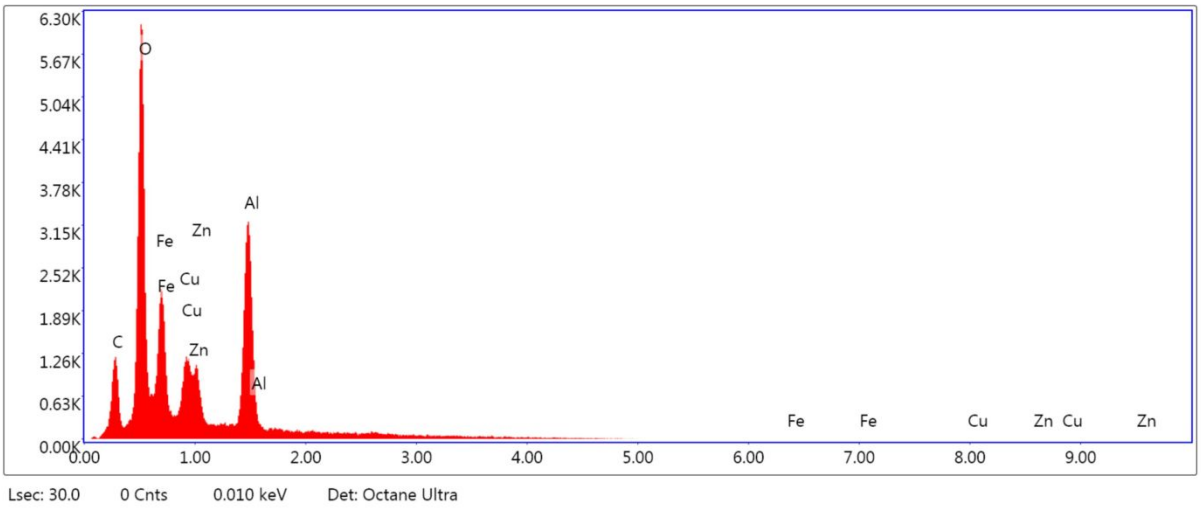

Figure S7. EDS point analysis of the constituent phase at point 608 in Figure 5e. The Atomic Cu/Fe ratio is 0.44, which is defined as $(Al,Cu)_6(Fe,Cu)$ according to ref 55.

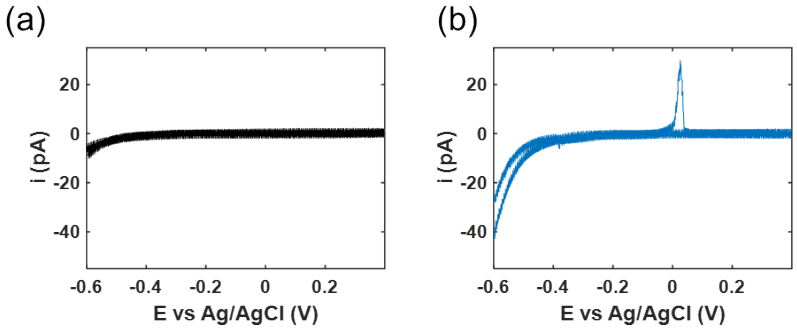

Figure S8. A micropipette filled with 3.5 wt% NaCl solution was landed on a glassy carbon working electrode. Ag/AgCl wire served as the QRCE. CVs were run from -0.6 to 0.4 back to -0.6 V at a scan rate of 100 mV to detect Ag^+. (a) In a freshly filled

micropipette, no peak was detected. (b) In the micropipette after a long time OI-SMCM scanning, a peak representing Ag oxidation was observed. This indicates the presence of Ag^+ in the droplet at the end of micropipette.

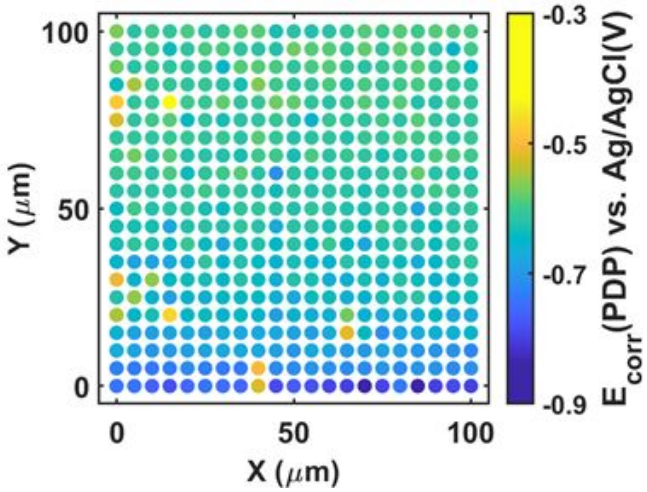

Figure S9. The corresponding E_{corr}(PDP) map of the scanned area in Figure 6a. E_{corr} values were extracted from the PDP measurements.

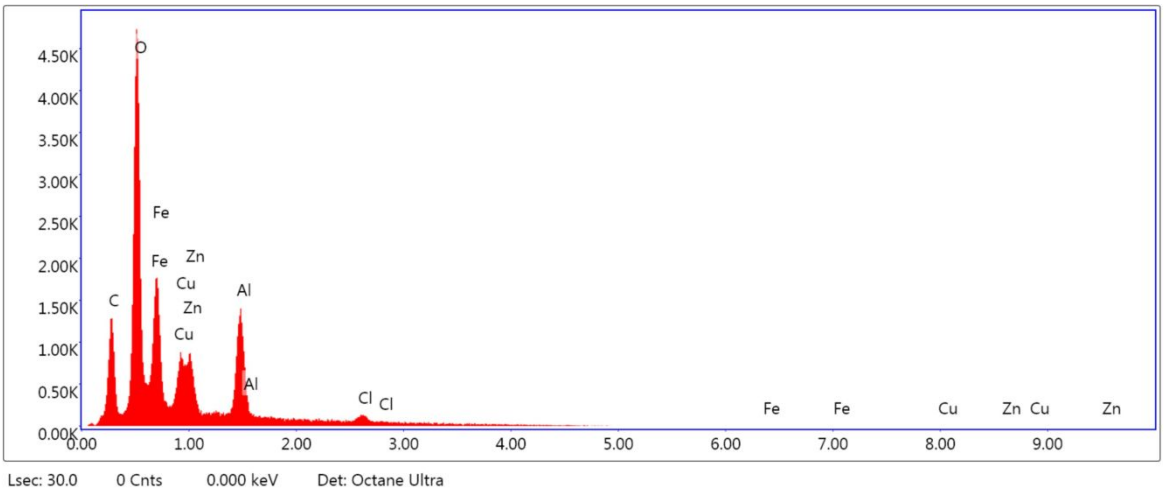

Figure S10. EDS point analysis of the constituent phase at point 13 in Figure 6c. The Atomic Cu/Fe ratio is 0.34, which is defined as $(Al,Cu)_6(Fe,Cu)$ according to ref 55.

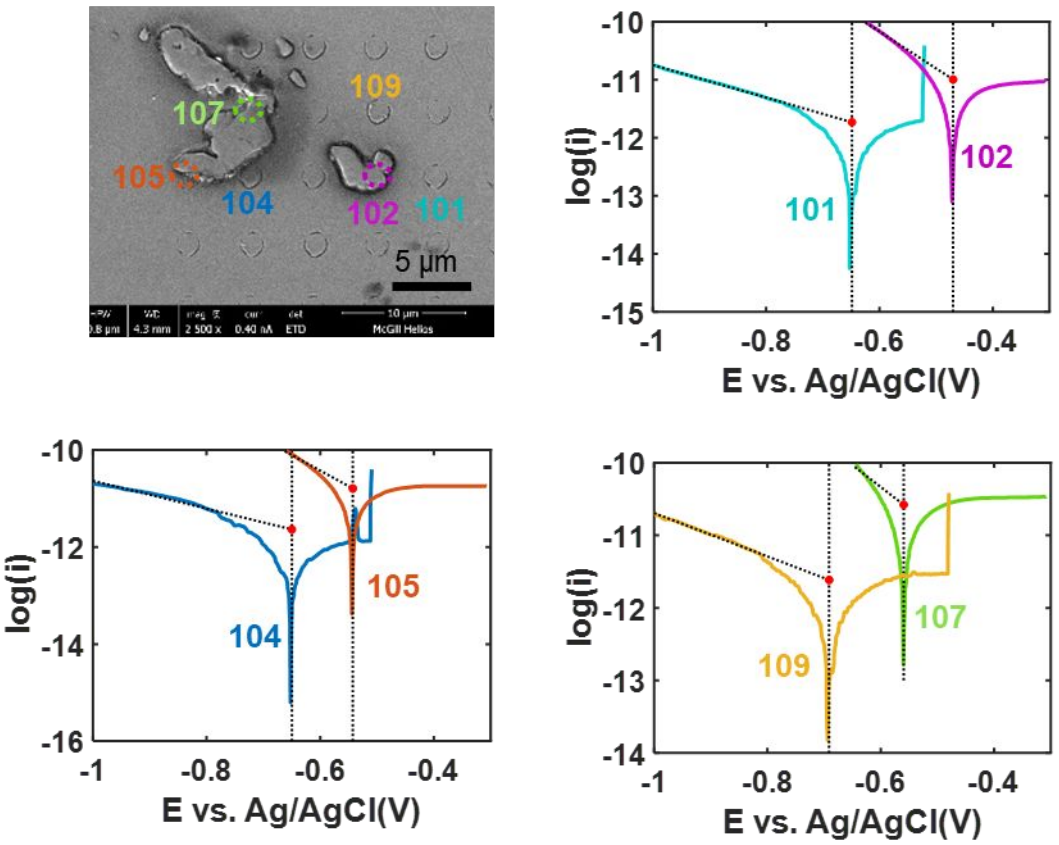

Figure S11. SEM images of the Fe-rich constituent phases on the scanned surface in Figure 6a and the corresponding PDP curves with I_{corr} extraction.