Correlating Corrosion to Surface Grain Orientations of Polycrystalline Aluminum Alloy by Scanning Electrochemical Cell Microscopy

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Table S1. The composition of AA7075-T73 measured using ARL™ 4460 Optical Emission Spectrometer (Thermo Fisher Scientific). The percentage numbers were averaged from four repetitions.

Elements	Al	Zn	Mg	Cu	Cr	Fe	Si
Weight Percentage	90.3	5.6	2.25	1.35	0.19	<0.05	<0.04

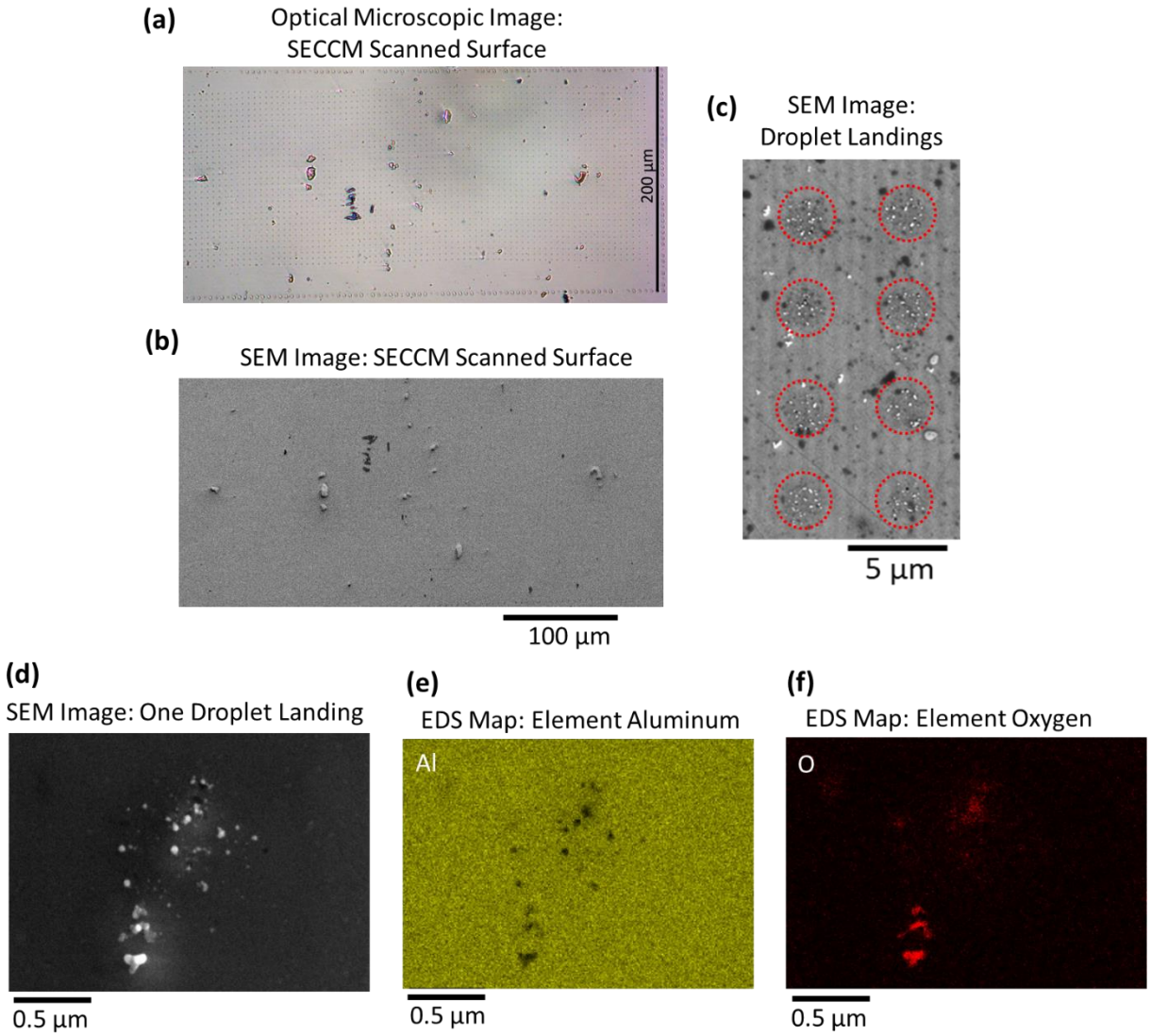

Figure S1. Images of the OI-SECCM scanned surface of Al alloy AA7075-T73. (a) Optical Microscopic image. The points show the droplet landing locations. (b) SEM image of the SECCM scanned surface. (c) SEM image of eight droplet landings. (d) SEM image of one droplet landing location after OCP and PDP measurement. EDS maps of element (e) Al and (f) O.

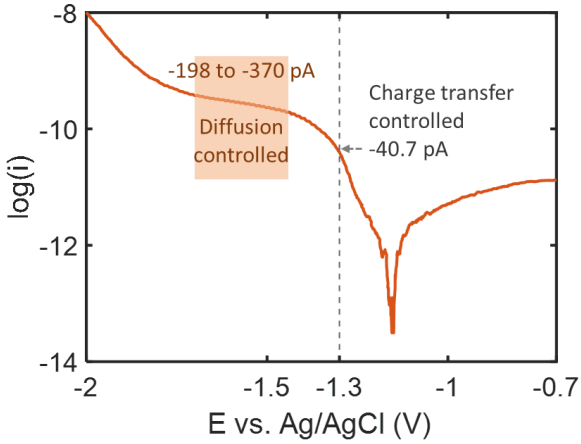

Figure S2. Tafel plot of the cathodic reaction ORR in the oil-immersed SECCM experiment at 23 ºC. A 3.5 wt% NaCl droplet formed at the end of a 2 µm diameter micropipette landed on the surface of Aluminum AA7075-T73. LSV was carried out on the droplet wetted surface from -0.7 to -2.0 V vs. Ag/AgCl at a scan rate of 100 mV/s.

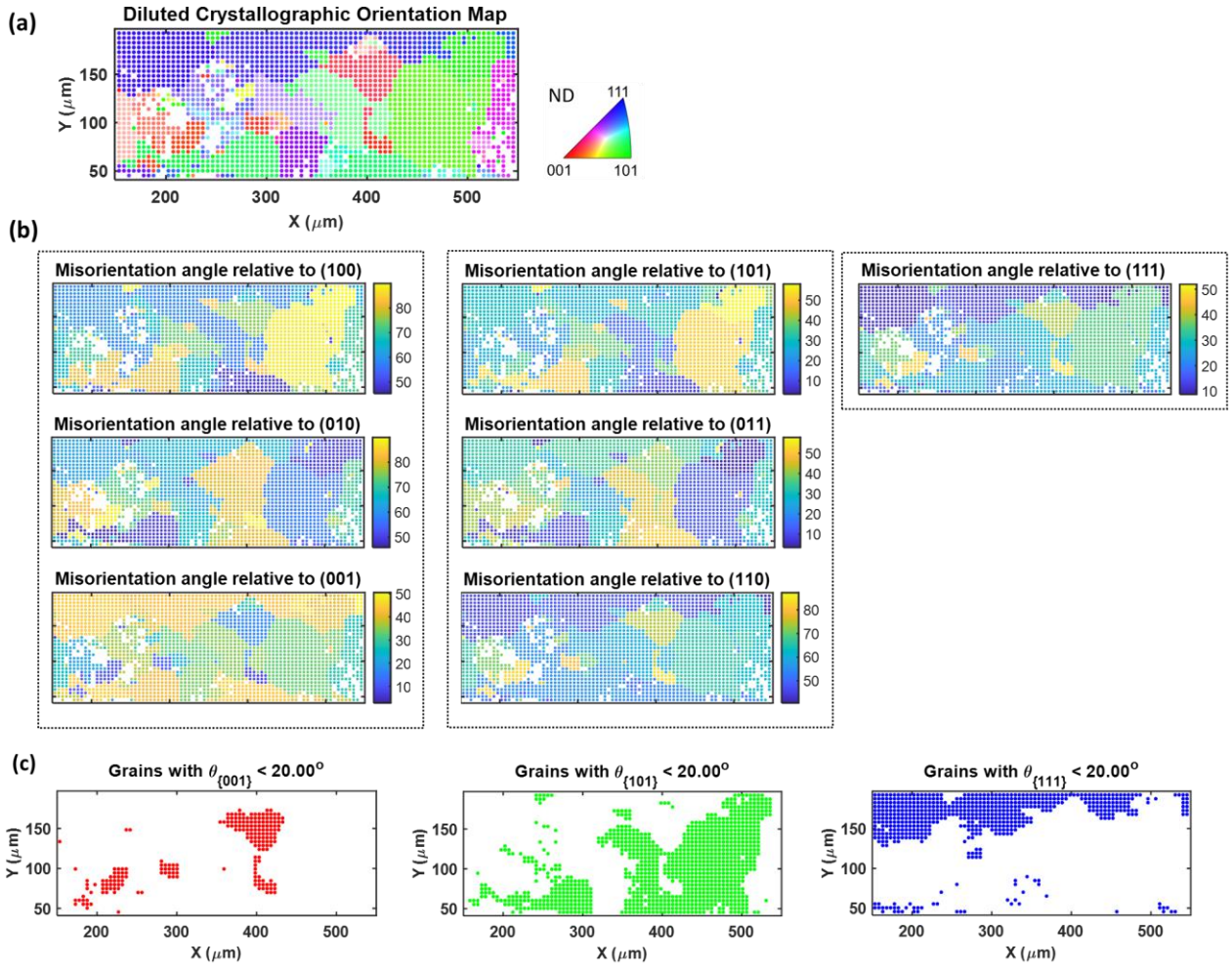

Figure S3. (a) Diluted IPF crystallographic orientation map generated using MATLAB. It has the same density as OI-SECCM map. The empty points indicate mis-indexed pixels of EBSD mapping. (b) Misorientation angles of grains relative to the {001}, {101} and {111} planes. The color bars on the right side indicate the degree of misorientation angle. (c) Grains with misorientation angle (θ) less than 20 degrees were classified into three groups: {001}, {101} and {111}.

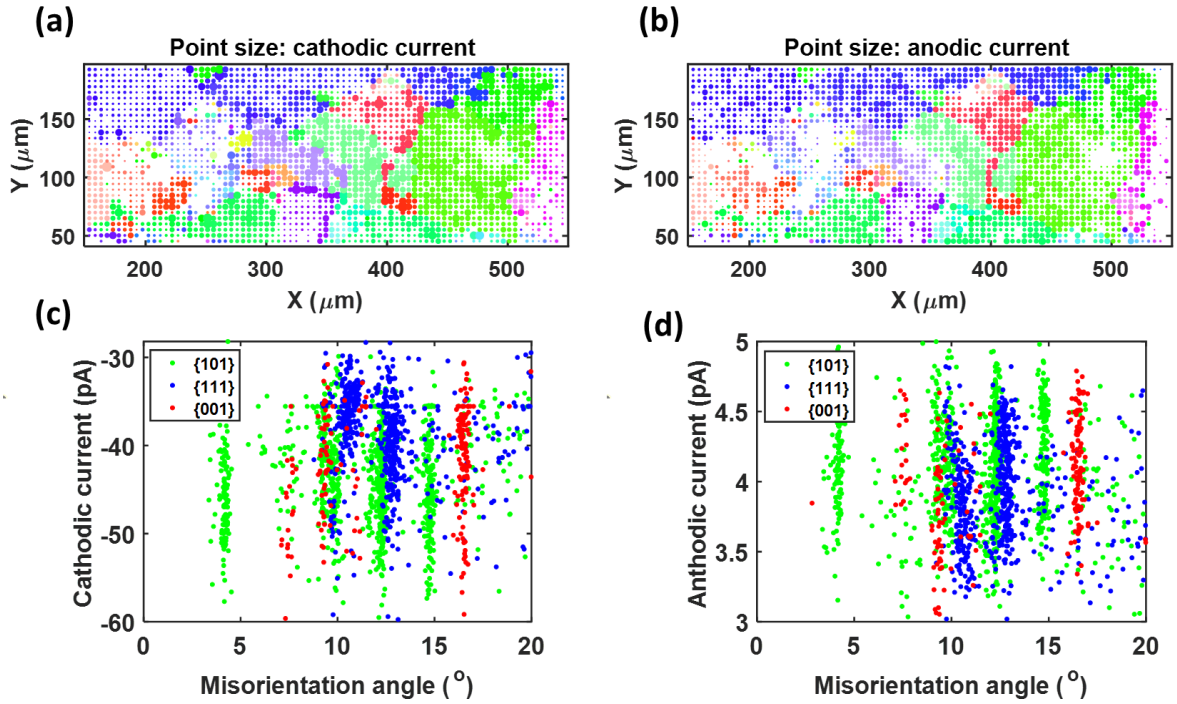

Figure S4. (a) Cathodic current map and (b) anodic current map on different grains. (c) Cathodic currents (at -1.3 V vs. Ag/AgCl) and (d) anodic currents (at 0.7 V vs. Ag/AgCl) plotted as a function of misorientation angle relative to {101}, {111} and {001} grains.