Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Morphological Control of Au Dendrite Electrocatalysts for CO_2 Reduction[1] NATHAN T. NESBITT, Boston College, MING MA, TU Delft, BRITTANY E. CARTER, LUKE A. D'IMPERIO, JEFFREY R. NAUGHTON, DAVE T. COURTNEY, STEVE SHEPARD, MICHAEL J. BURNS, Boston College, WILSON A. SMITH, TU Delft, MICHAEL J. NAUGHTON, Boston College — Au has demonstrated the highest catalytic selectivity, activity, and stability for CO_2 reduction to CO of any metal, but the mechanism for this performance remains unclear. Studies of nanoparticle films have shown that higher index facets have improved performance, but the preeminent nanoparticle films, from oxide-derived Au, lack well-defined facets and morphological stability to illuminate their enabling mechanism. More recent work has shown Au needles with a sub 5 nm radius of curvature have excellent performance and stability, independent of crystal facet. The same studies, however, still show calculations expecting a facet dependance. Here we demonstrate a facile and novel dendrite fabrication process with tunable morphology. The dendrites show high catalytic selectivity, activity, and stability for CO_2 reduction to CO, along with morphological stability after 18 hours of operation, allowing correlation between morphology and performance. The influence of exposed facets will be discussed.

[1]This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. (DGE-1258923).

Nathan T. Nesbitt
Boston College

Date submitted: 11 Nov 2016 Electronic form version 1.4