Supporting Information

Composition-Selective Fabrication of Ordered Intermetallic Au-Cu Nanowires and Their Application to Nano-Size Electrochemical Glucose Detection

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1. TEM analysis of the ordered intermetallic Au_3Cu nanoplate

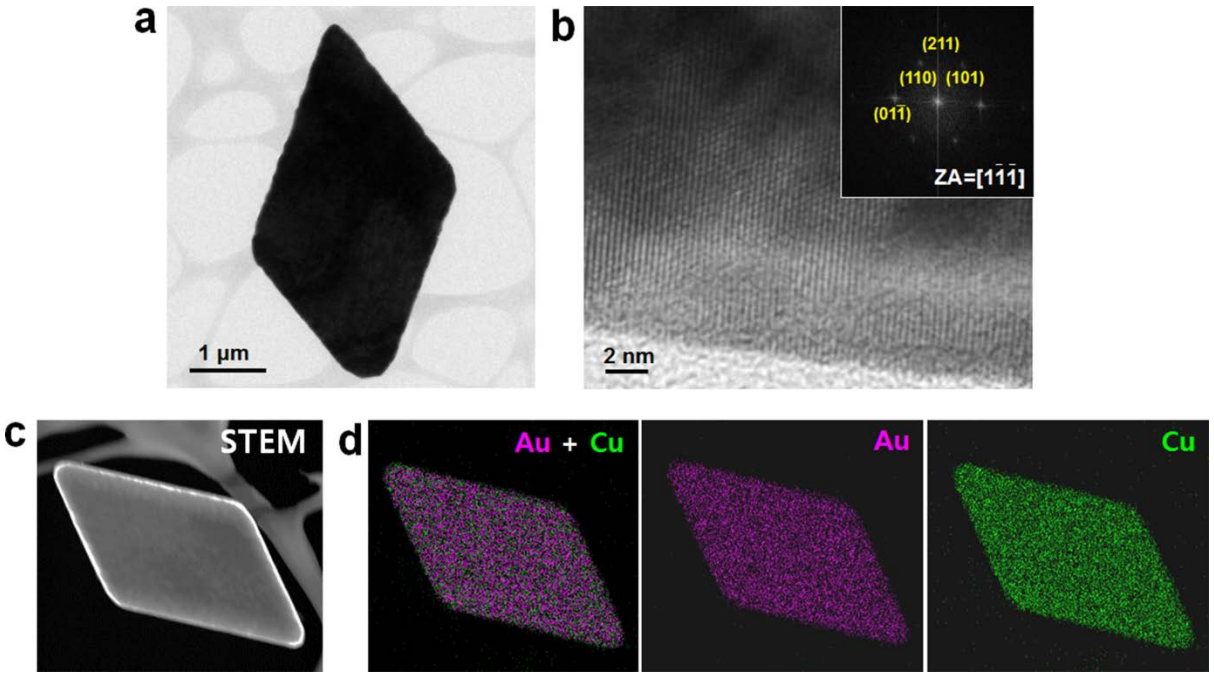

Figure S1. TEM results of Au_3Cu nanoplate grown on *m*-cut sapphire substrate by supplying Cu-containing species on Au nanoplate at position A. (a) Low-resolution TEM image. HRTEM image and FFT pattern in (b) represent that nanoplate has Au_3Cu phase with a *fcc* and maintains the single-crystallinity. (c) STEM image and (d) mapping analysis displays homogeneous atomic distribution of two elements over the whole area of nanoplate.

2. TEM analysis of the ordered intermetallic $AuCu_3$ nanoplate

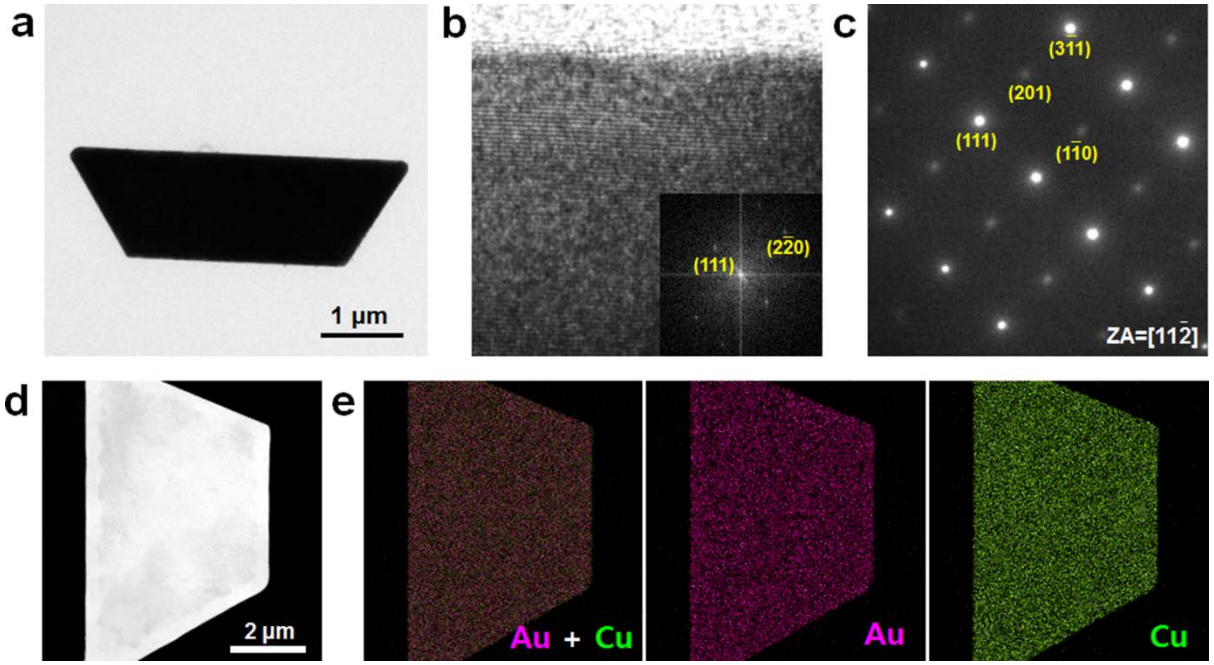

Figure S2. TEM results of $AuCu_3$ nanoplate grown on *m*-cut sapphire substrate by supplying Cu-containing species on Au nanoplate at position B. (a) Low-resolution TEM image. HRTEM image and FFT pattern in (b) and (c) SAED pattern represent that the nanoplate has a $AuCu_3$ phase with a *fcc* crystal structure and maintains the single-crystallinity. (d) STEM image and (e) mapping analysis illustrates homogeneous atomic distribution of Au and Cu over the whole area of a nanoplate.

3. SEM images of the annealed Au NWs in the absence of CuI precursor

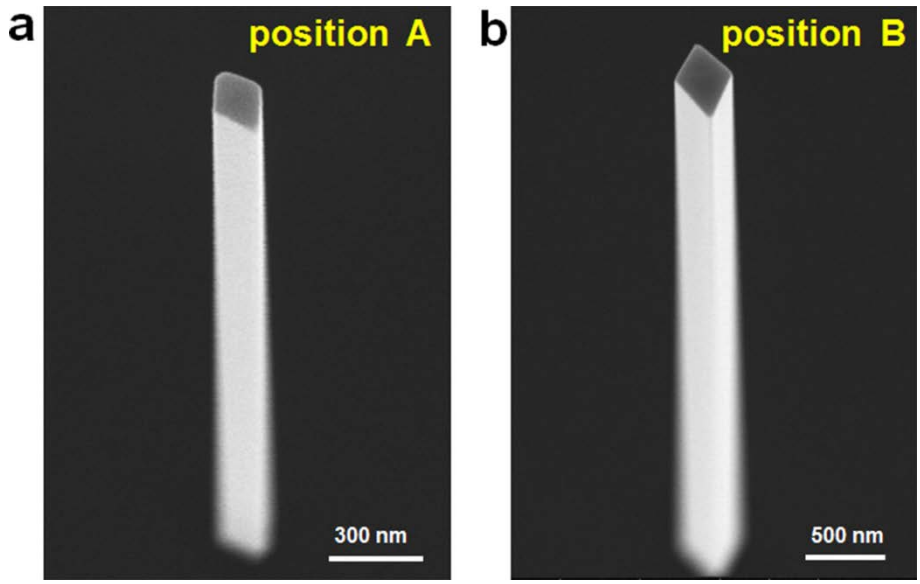

Figure S3. SEM images of NWs after annealing of Au NWs at the position A and B in the absence of CuI precursor at the second synthetic step. In both of cases (a) and (b), morphologies of annealed NWs are the same as the original Au NWs, indicating that cross-sectional shape change of $AuCu_3$ NWs can be attributed to incorporation of Cu atoms.

4. TEM analysis for the oxidation resistant property of the $AuCu_3$ NWs

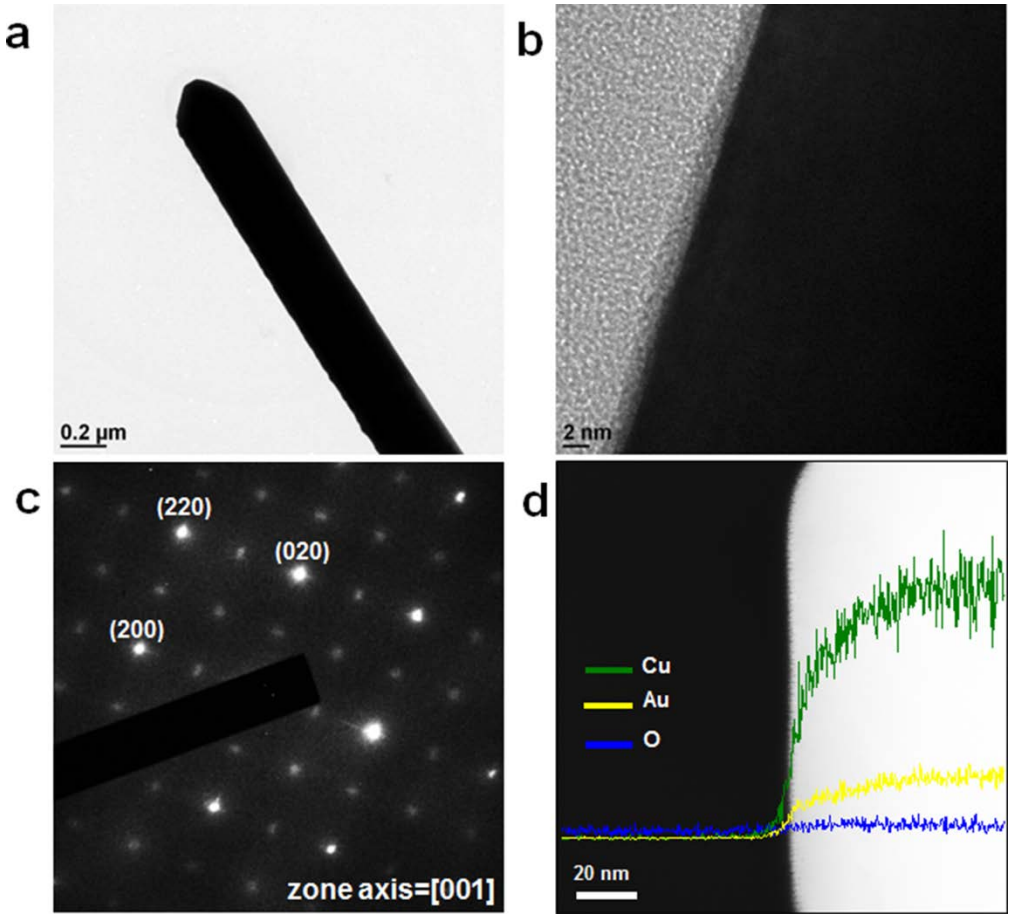

Figure S4. TEM results of $AuCu_3$ NW after oxidation under ambient condition at room temperature for 20 days. Crystal structure and atomic composition of NW are retained, indicating that the ordered intermetallic $AuCu_3$ NWs are fairly resistant to oxidation for 20 days.

5. Schematic of fabrication process for individual NW electrode

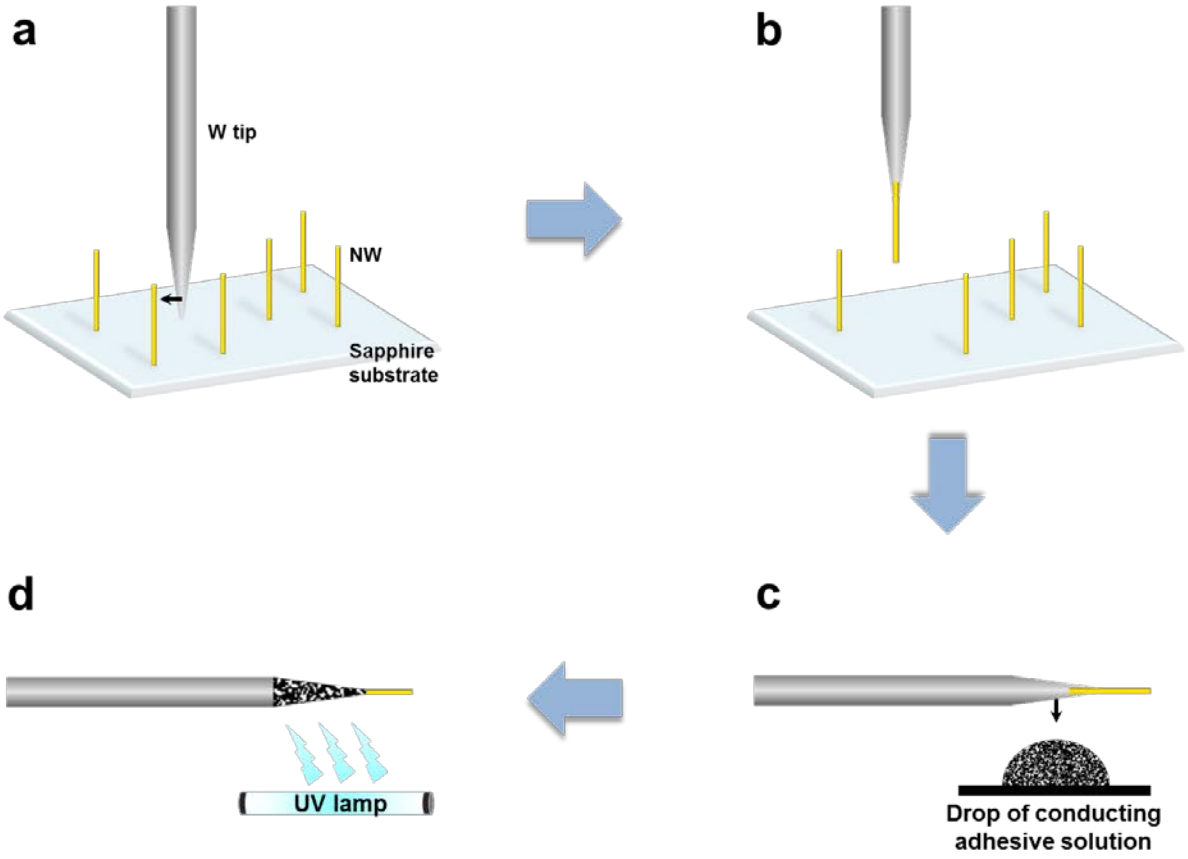

Figure S5. Schematic of the fabrication process for a individual NW electrode. (a) W tip approached to NW, (b) NW-attached tip, (c) coating the junction of W tip and NW with UV-curing conducting adhesive solution and (d) NW electrode exposed to UV light.