

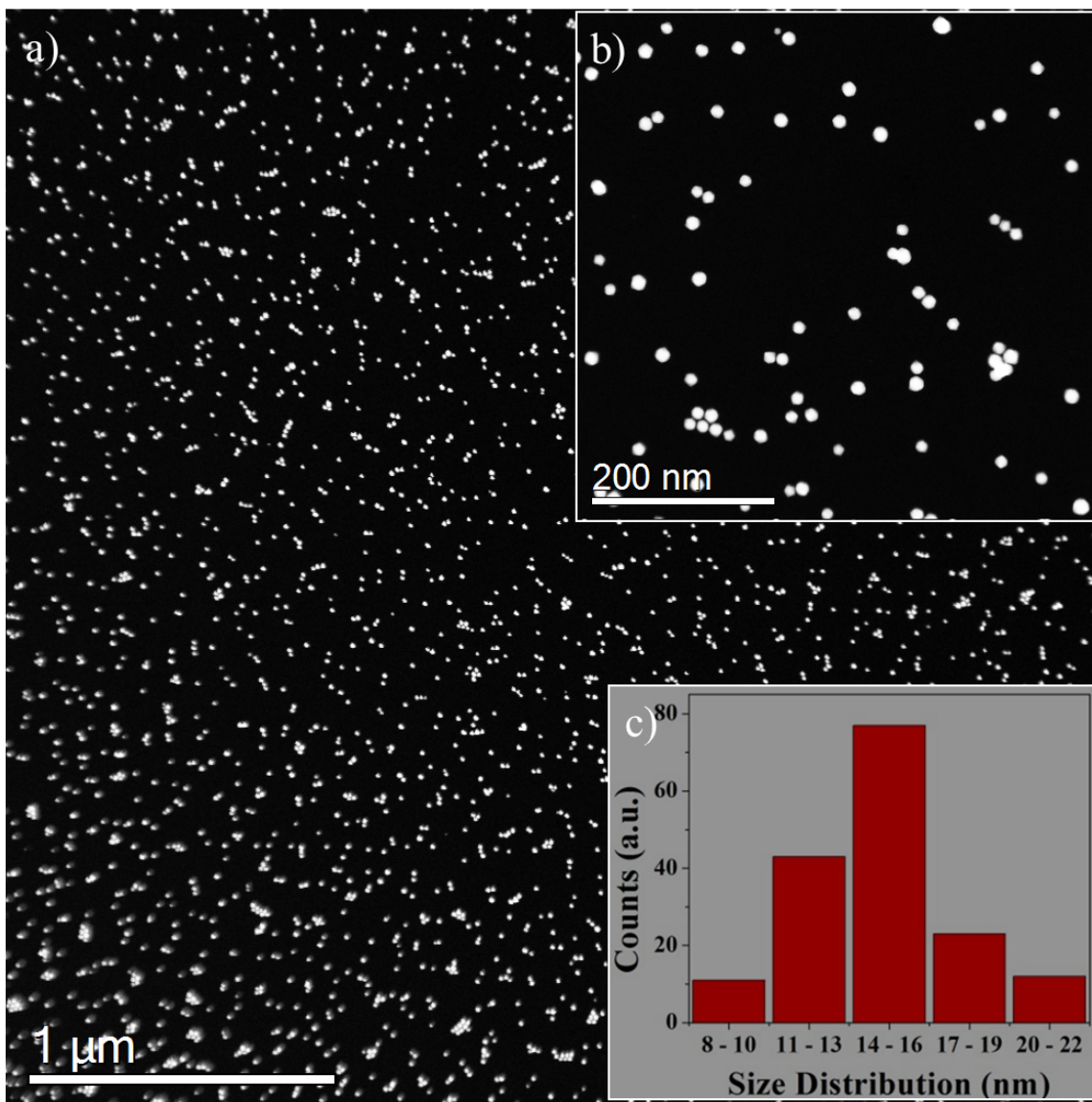
## Supporting Information

### **Highly Monodisperse Multiple Twinned AuCu/Pt Trimetallic Nanoparticles with High Index Surfaces**

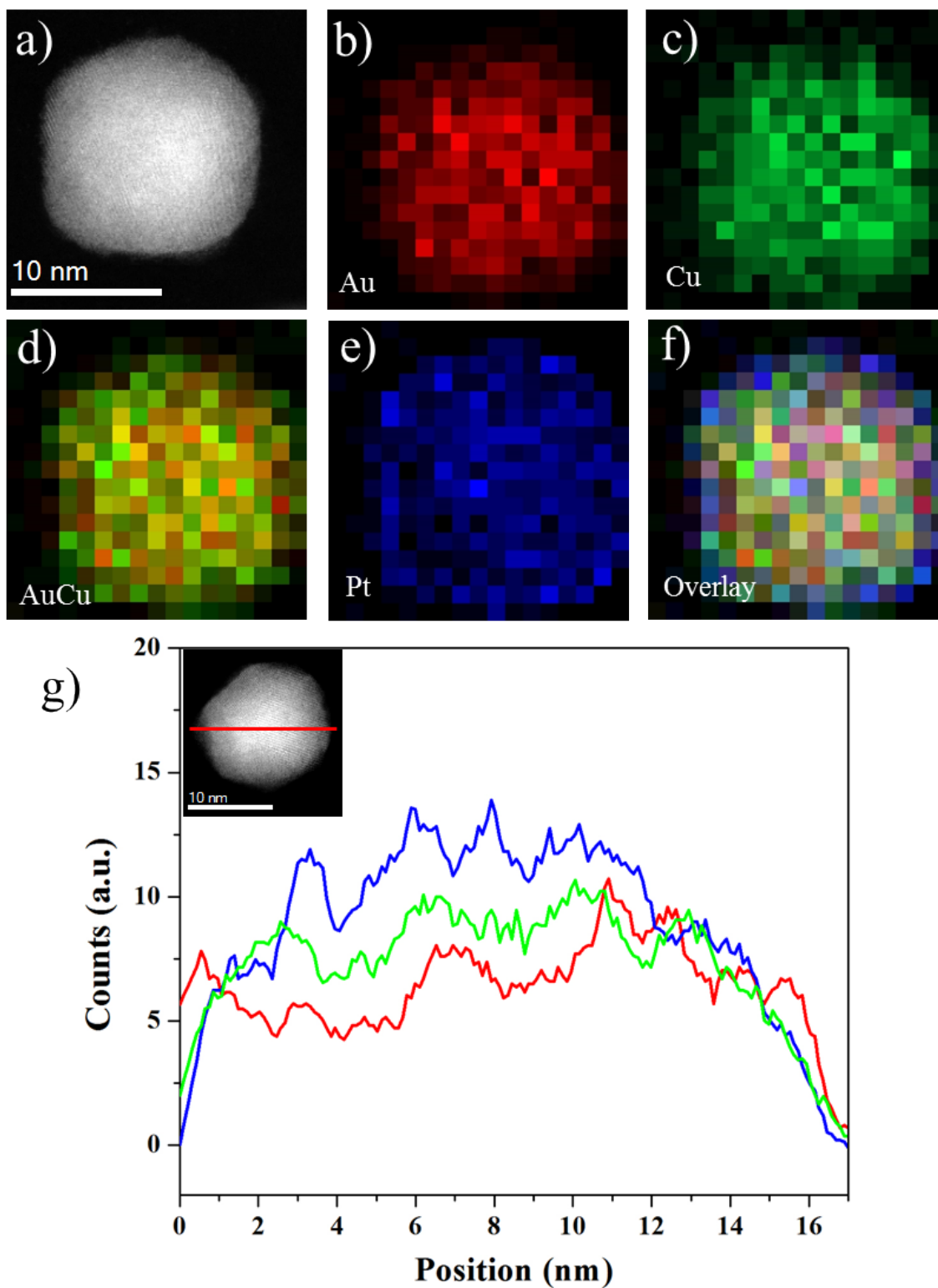
Subarna Khanal, Nabraj Bhattarai, David McMaster, Daniel Bahena, J. Jesus Velazquez-Salazar, and Miguel Jose-Yacaman\*

Department of Physics and Astronomy, University of Texas at San Antonio, One UTSA Circle, San Antonio, TX, 78249

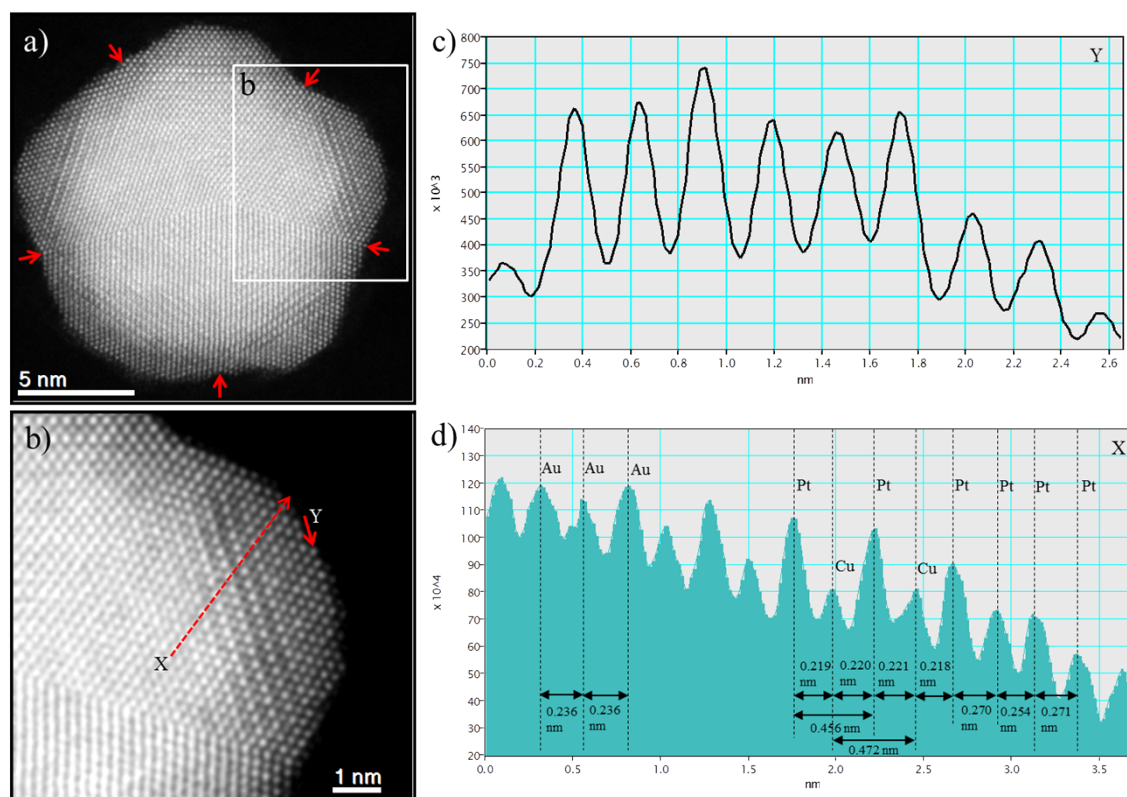
E-mail: [miguel.yacaman@utsa.edu](mailto:miguel.yacaman@utsa.edu)



**Figure S1.** Dark-Field STEM images of AuCu/Pt trimetallic nanoparticles dark field images STEM image of Cu-Pt bimetallic nanoparticles. The inset figure (b) and (c) represents the HAADF-STEM image and Size distribution histogram, the average diameter is  $15.0 \pm 1.0$  nm.



**Figure S2.** (a) HAADF-STEM image of AuCu/Pt multiple twinned nanoparticles, (b-f) EDX elemental maps of nanoparticles – Au, Cu, AgPd alloy, Pt, and Overlay respectively, (g) EDX spectrum of corresponding AuCu/Pt multiply twinned nanoparticles.



**Figure S3.** (a) HAADF-STEM image of a nanoparticles in AuCu/Pt Trimetallic penta-twinned structure oriented along [011] zone axis, (b) Close-up image of the rectangle area of Figure 4a, shows the Cu atoms are interdiffused in to the AuCu-core and Pt-shell region, (c) Intensity profile of the top surface layer in (b) (red arrow symbol by 'Y'), where the disparity of the intensity in the atomic columns can be observed, (d) Intensity profile of the core, interface and shell regions (red dot arrow symbol by 'X') shows the different elements intensity peaks.