

## G22829-Reich Data Repository

### MOVIE CAPTIONS

#### Movie 1

HAADF-STEM movie of in-situ heating of a Au nanoparticles ( $0.2 \mu\text{m}^2$  area) between 25-550°C. Au nanoparticles (bright spots on the darker  $\text{Fe}(\text{S},\text{As})_2$  matrix) remained unchanged until  $\sim 370^\circ\text{C}$ . Above this temperature, larger particles ( $>8 \text{ nm}$ ) grow at the expense of the smaller ones ( $<4 \text{ nm}$ ). Total duration of the experiment was  $\sim 45$  minutes. Movie duration is 55 seconds. Temperature (in °Celsius) is shown on the upper right corner (Quicktime avi, 2.4 MB). (See movie file [2006225\\_300K.avi](#))

#### Movie 2

Real time HRTEM movie of in-situ heating of a faceted single Au nanoparticle recorded during  $\sim 20$  seconds at  $\sim 450^\circ\text{C}$ . The Au particle decreases in size and crystal facets become more irregular. Lattice fringes can be observed, and a dark contrast halo develops around the particle. Scale bar is 5 nm (Quicktime avi, 8.4 MB). (See movie file [2006225\\_450K.avi](#))

#### Movie 3

Real time HRTEM movie (7 seconds) of in-situ heating of the same nanoparticle in Movie 2, now at  $\sim 480^\circ\text{C}$ . The Au particle continues to shrink, and its edges are no longer aligned parallel to specific crystallographic directions. Lattice fringes are still observed, and the dark contrast halo engulfs the particle. Scale bar is 5 nm (Quicktime avi, 3.2 MB) (See movie file [2006225\\_480K.avi](#))

#### Movie 4

Real time HRTEM movie (10 seconds) of in-situ heating of the same nanoparticle in Movies 2 and 3, now at  $550^\circ\text{C}$ . The movie captures the exact moment when the Au nanoparticle shrinks significantly and dissolves completely into the host matrix. The dark

halo remains around where the particle was. Scale bar is 5 nm (Quicktime avi, 4.6 MB).

(See movie file [2006225\\_650K.avi](#))

### Movie 5

Real time HRTEM movie of the last 37 seconds of *in-situ* heating of two Au nanoparticles in the same frame, at 650°C. The smaller particle dissolves into the arsenian pyrite host in the presence of the larger particle. Scale bar is 50 nm (Quicktime avi, 16.1 MB). (See movie file [2006225\\_850K.avi](#))