

# Supplementary information for: In situ tuning of nanorods' plasmon through oxidative etching with KCN

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July 30, 2015

## 1 Bulk Results

Figure 1 shows the behavior of the same nanorods dispersed in  $100 \mu\text{M}$  KCN. It is possible to observe a clear blue shift of the longitudinal plasmon resonance, towards the transverse peak at around 530 nm. As stated in the main text, we attribute the blue shift of the peak to a shortening of the long axis of the rods. This is because the CTAB is more efficient protecting the sides than the tips of the particles. It is also possible to note an asymptotic blue-shift of the plasmon. We attribute this to a complete reaction of the KCN with the gold atoms. If more KCN was added to the vial, the blue-shift would have continued.

The spectra were acquired in an UV-Vis spectrometer. The first spectrum was acquired with the rods dispersed in water, before adding KCN into the vial. Later a solution such that the final concentration was  $100 \mu\text{M}$  was added and a set of automatic spectra was recorded at a fixed interval of time. The peak position was extracted by fitting a double lorentzian, one with a fixed central wavelength (the transverse resonance) and a second one for the longitudinal plasmon.

## 2 SEM Images

Figure 2 shows the SEM images of the rods. In 2a an example of the rods after synthesis and before being etched. 2b and 2c are after 2 minutes in  $20 \mu\text{M}$ KCN and the difference on the shape of the particles when they are separated from each other and in contact is notable. 2d and 2e were taken after 4 minutes in KCN. The histograms 2f-h show the analysis of the aspect ratio, the longitudinal and the transverse axis respectively for each of the cases. The changes observed for the axis are inside the standard distribution of each parameter. Table 2 summarizes the averaged values found after analyzing approximately 300 particles. However the small shift in the average is consistent with the optical results, yielding an etching rate of  $0.5 \text{ nm/min}$ .

	L (nm)	Sdv (nm)	R (nm)	Sdv (nm)
0min	51	5	24	3
2min	50	5	23	3
4min	49	5	22	2

Table 1: Summary of the results obtained for 300 different particles while imaging them with an SEM.

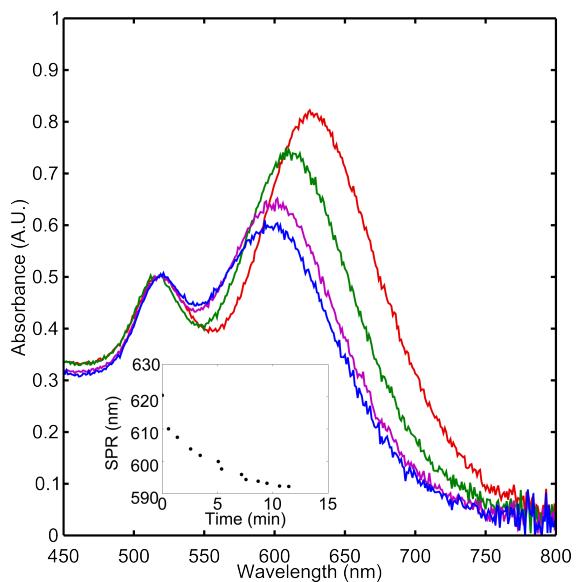


Figure 1: Extinction spectra of a bulk suspension of gold nanorods dispersed in  $100 \mu\text{M}$  KCN. The curves are displayed at 2minutes intervals. The inset shows the peak position as a function of time. The curves were normalized to the transverse peak for clarity.

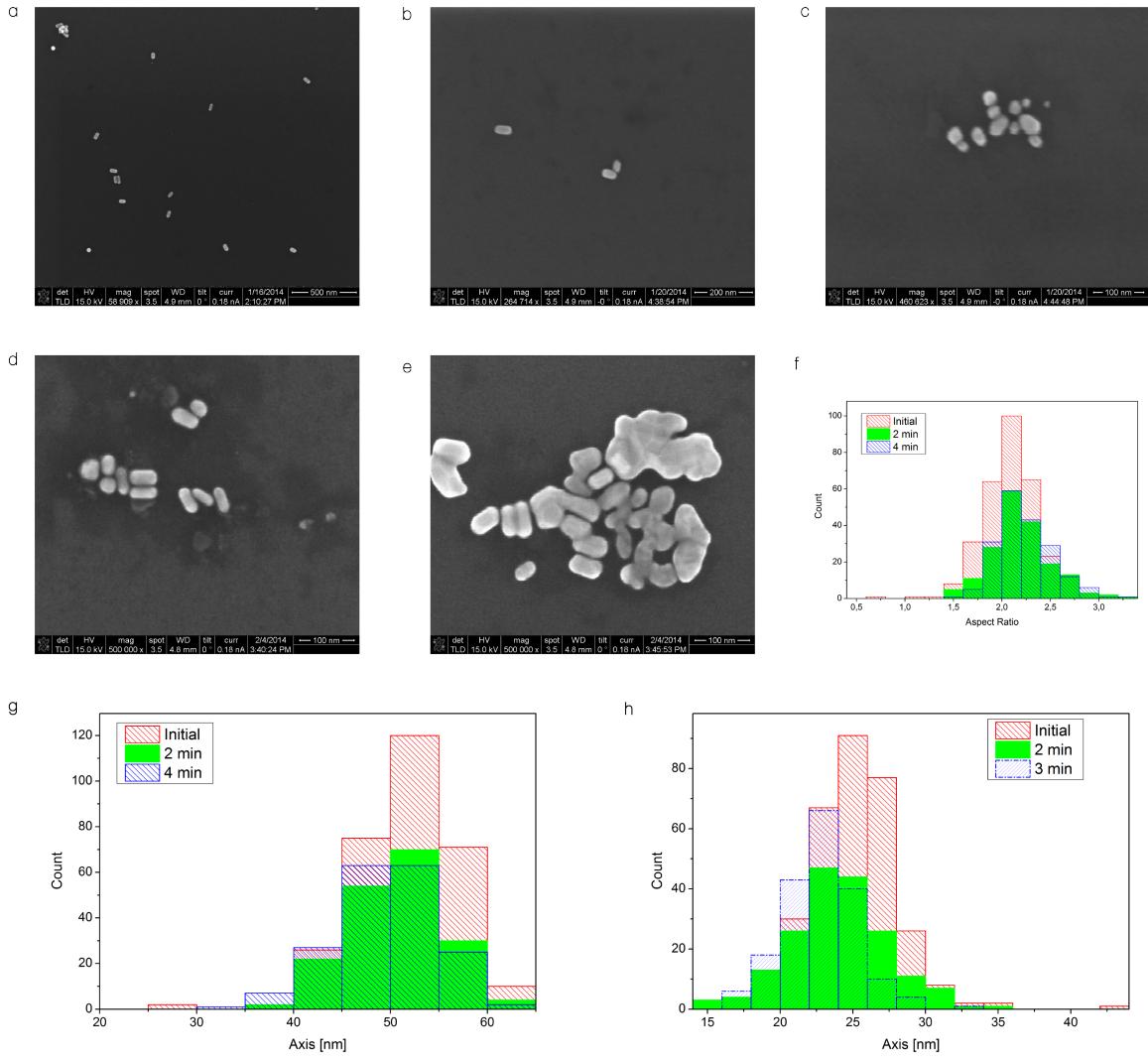


Figure 2: SEM Images of the rods a) after synthesis, b) after 2 minutes in 20  $\mu\text{M}$  KCN when particles are separated, c) or when they form clusters. d) separated particles after 4 minutes in KCN and e) when they were forming a cluster. f-h) Histograms of the aspect ratio, longitudinal and transverse axis for each of the cases (before, after 2 and after 4 minutes in KCN.)