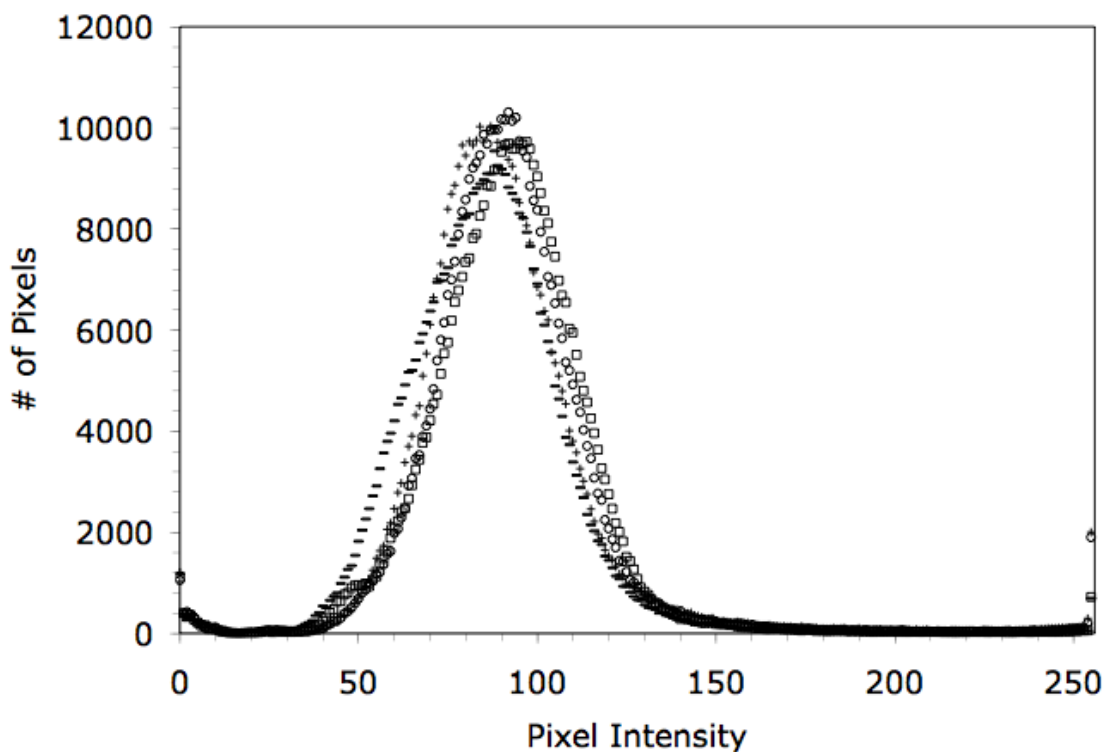


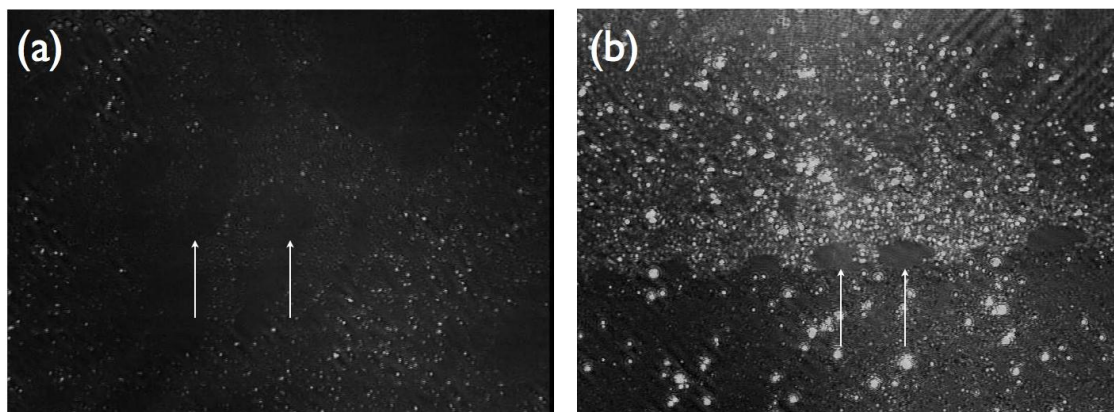
## Supplemental Information

To confirm that we are not losing material to the subphase during the compression of the peptide molecules, we have performed multiple experiments that involve compression and expansion cycles. In the figure below, we show the histograms of images taken during these compression cycles at a surface pressure of 20 mN/m.



Supplementary Figure 1- Histogram for images taken at 20mN/m for the first 4 cycles of compression/expansion experiments performed in Figure 3. Cycle 1: dash, Cycle 2: plus sign, Cycle 3: Open circle, Cycle 4: open square. The data shows that material is not being lost to the interface since the overall intensity of the images shifts slightly toward higher pixel values upon each cycle indicating greater amount of peptide at the interface or the increased presence of aggregates.

We believe that the gold crystals being formed at the interface are being formed where the peptide crystals are being formed. One reason we believe this is that the yield of gold crystals is lower at lower surface pressures in which less peptide circular aggregates are formed. Additionally, images such as those in supplementary figure 2, show us gold formation occurs in the location of peptide aggregates. In supplementary figure 2, (a) shows the peptide forming circular domains, however there are areas through out the image (holes) that contain no peptide domains. Image (b) is taken after gold addition and the interface considerably brightens because of the presence of gold, however there are still areas that can be seen that contain no peptide or gold crystals.



Supplementary Figure 2: Brewster angle microscopy images at a surface pressure of 10mN/m taken (a) before and (b) after gold addition to the subphase. Width of both images is 220  $\mu\text{m}$ . White arrows indicate areas containing in (a) no peptide domains and in (b) no peptide domains or gold crystals.