

Supporting Information

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**Synthesis, Characterization, and Catalytic Application of Networked Au Nanostructures
Fabricated using Peptide Templates**

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(6 pages)

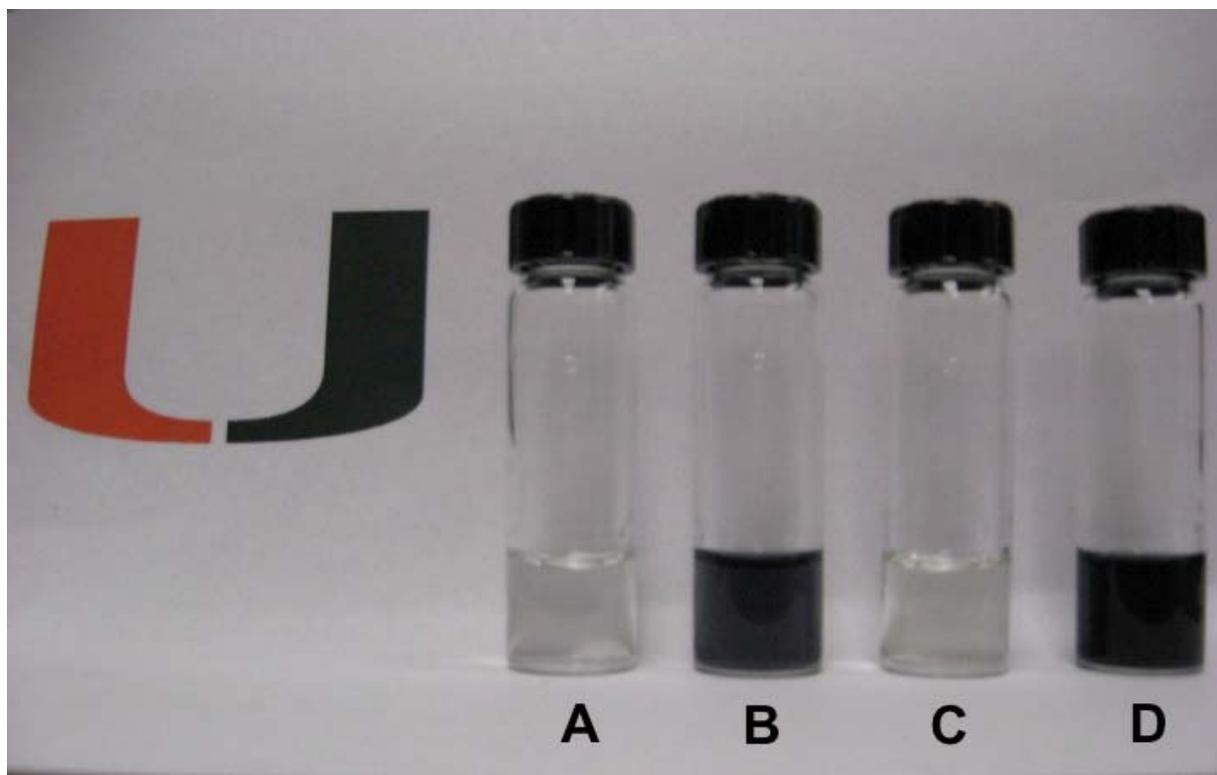


Figure S1. Image demonstrating the solution color and intensity with increased Au loading for the Au30 and Au60 NPN samples. Parts (A and B) represent the Au30 ratio with the R5 peptide before and after reduction, respectively, while parts (C and D) present the same images for the Au60 materials.

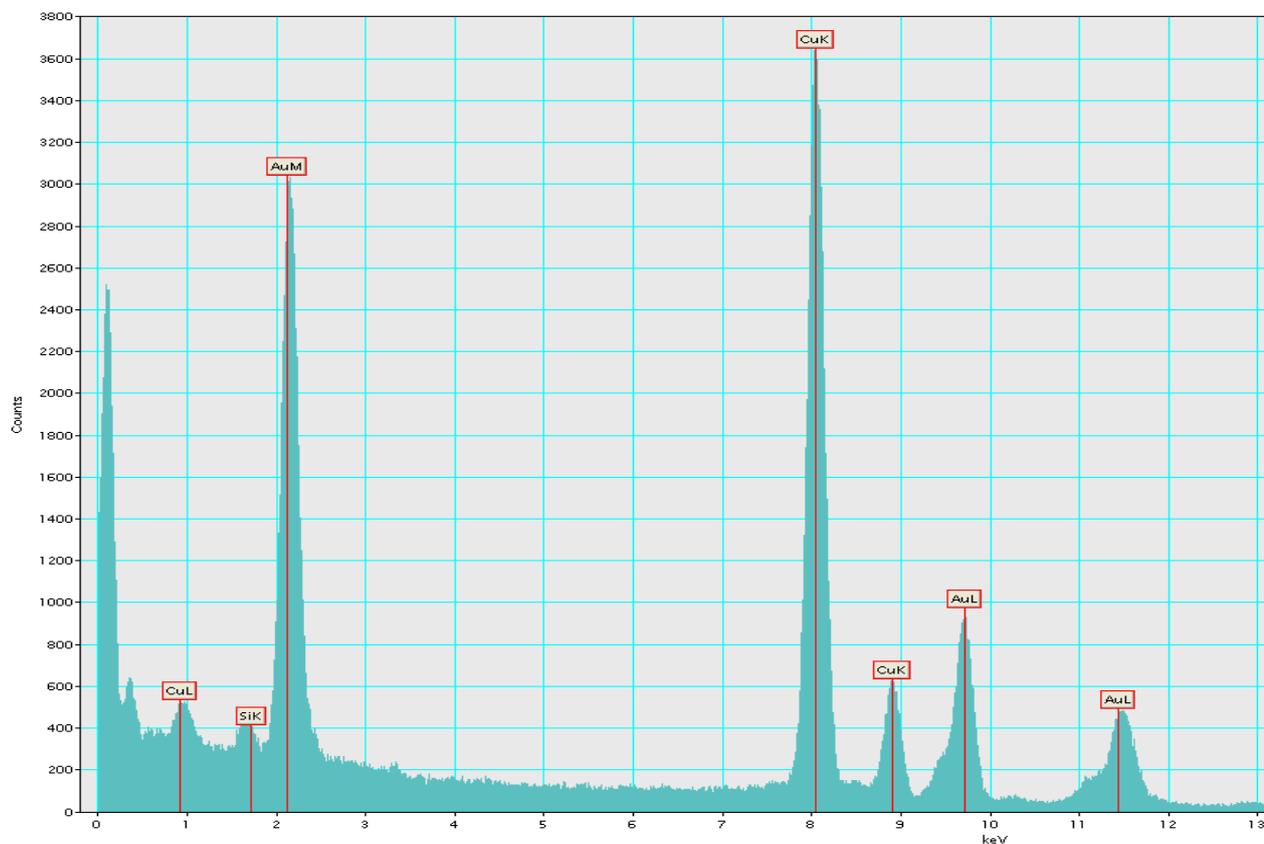


Figure S2. EDS analysis of the Au₃₀ NPNs. The Au peaks arise from the peptide-based materials, while the Cu peaks arise from the Cu grid used during the analysis.

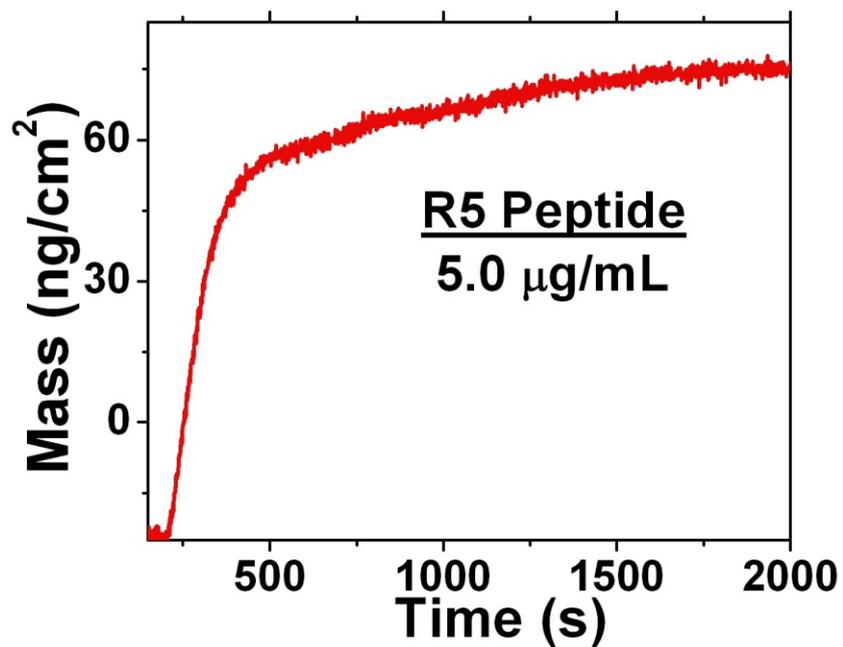


Figure S3. QCM plot for the R5 peptide binding of a metallic Au surface where an increase in mass is observed that reaches saturation at ~ 65 ng/cm².

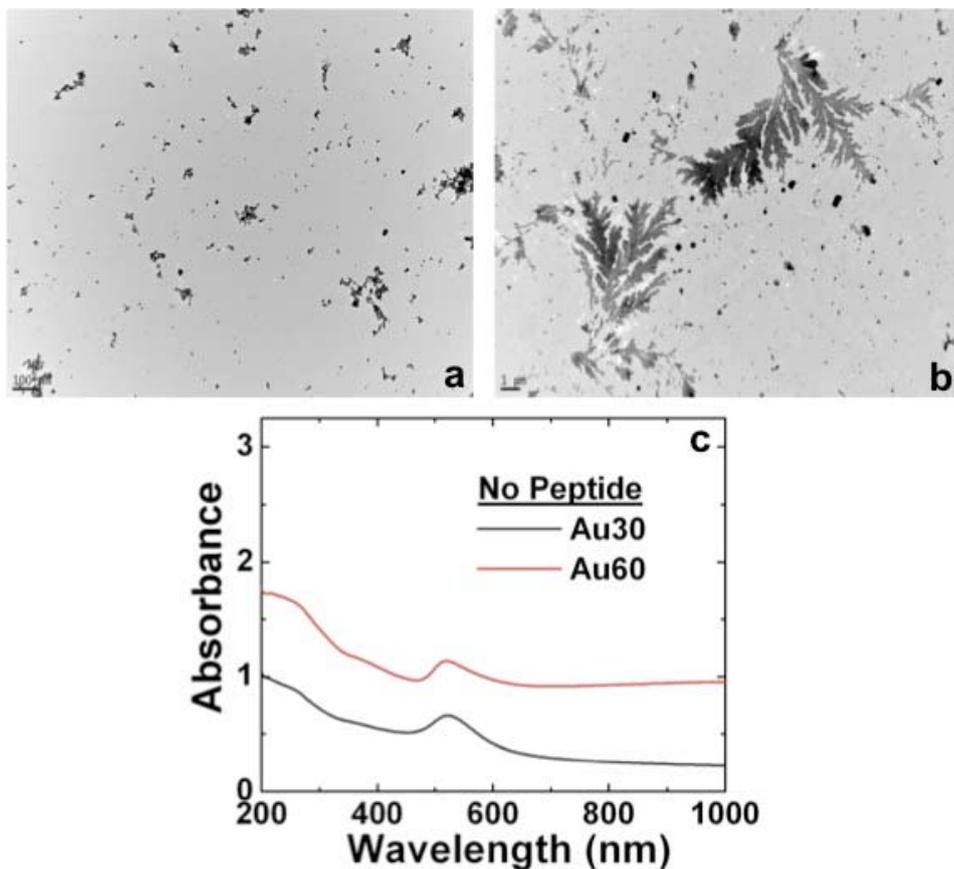


Figure S4. TEM and UV-vis analysis for the Au₃₀ and Au₆₀ materials prepared in the absence of the R5 peptide. Part (a) presents the TEM image of the peptide-free Au₃₀ structures, while part (b) displays the image of the un-capped Au₆₀ materials. As is evident, the structures are polydisperse in both size and shape due to the lack of a peptide template that controls the particle morphology. Part (c) presents the UV-vis analysis of the materials presented in parts (a and b).

| Particle Shape | Peptide | | | | No Peptide | | | |
|----------------|---------|----------------|---------|-----------------|------------|-----------------|---------|-----------------|
| | Au30 | | Au60 | | Au30 | | Au60 | |
| | Percent | Size/width(nm) | Percent | Size/width (nm) | Percent | Size/width (nm) | Percent | Size/width (nm) |
| Spheres | 0.0 | 0.0 | 0.0 | 0.0 | 33.0 | 7.7 ± 2.3 | 31.0 | 18.3 ± 4.2 |
| NPNs | 100.0 | 6.7 ± 1.1 | 100.0 | 7.1 ± 1.3 | 67.0 | 10.3 ± 1.9 | 31.0 | 15.0 ± 2.5 |
| Cubes | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.0 | 177 ± 57 |
| Ferns | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 24.0 | 205 ± 35 |

Figure S5. Size and shape distribution analysis for the materials fabricated with and without the R5 peptide template.