

## Supporting Information

### **Giant Chemical and Excellent Synergistic Raman Enhancement from Three Dimensional (3D) MoS<sub>2-x</sub>O<sub>x</sub>-Gold Nanoparticle Hybrid**

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## Microscopic and Spectroscopic Characterization Data

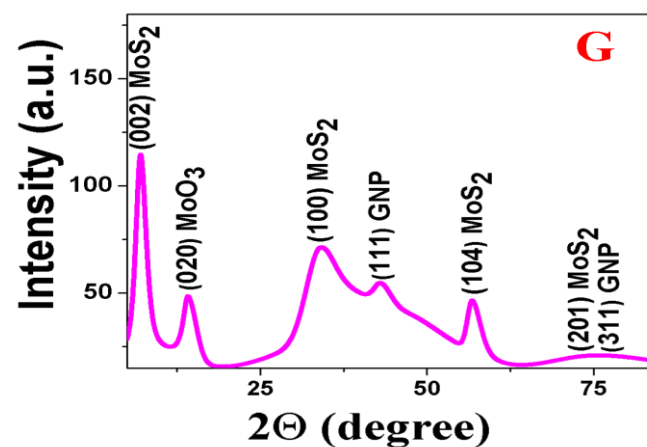
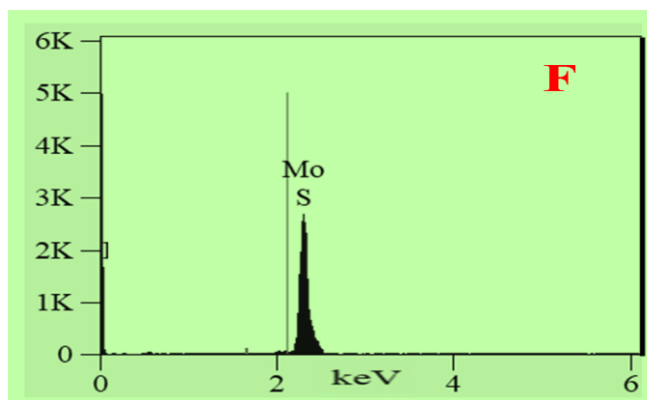
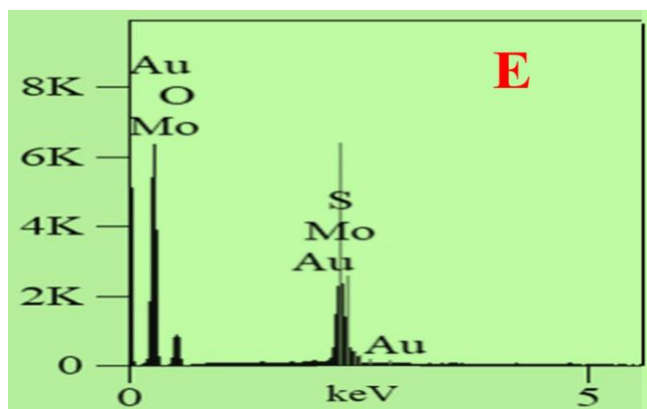
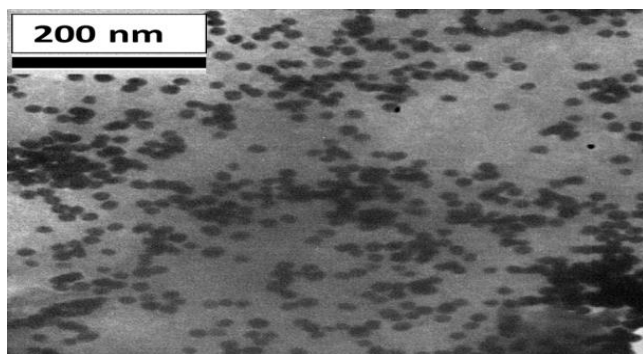
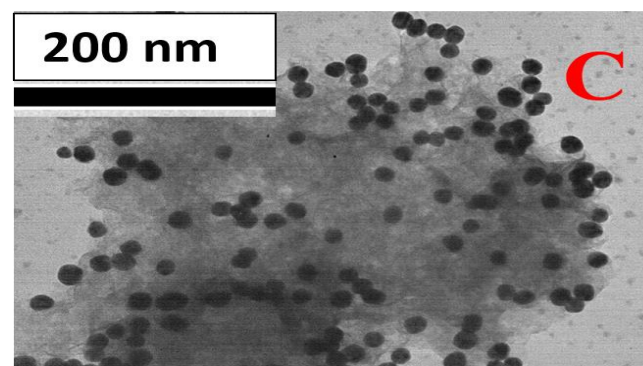
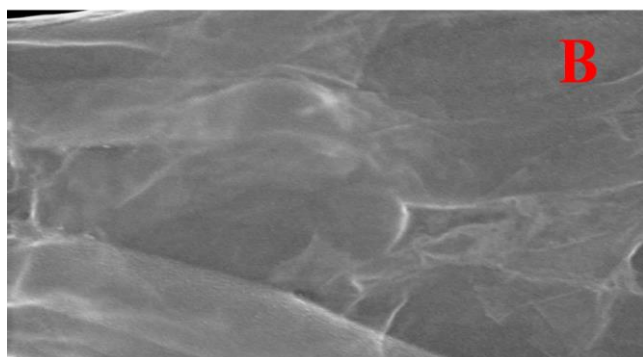
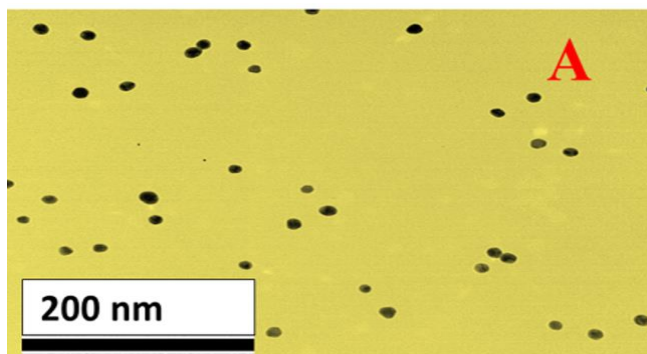
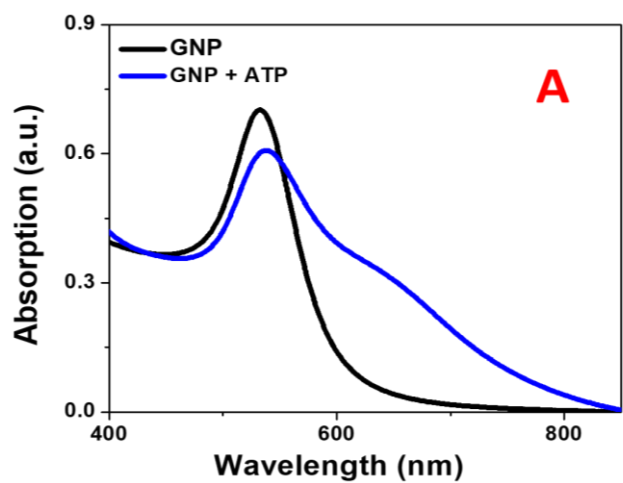


Figure S1: A) TEM image shows the morphology of GNP, B) SEM image shows the morphology of 2D  $\text{MoS}_{2-x}\text{O}_x$ , C) TEM image shows the morphology of 3D  $\text{MoS}_{2-x}\text{O}_x$ -GNP hybrid. D) TEM image shows the morphology of  $\text{MoS}_2$ -GNP hybrid. E) EDX spectra from  $\text{MoS}_{2-x}\text{O}_x$ -GNP hybrid. F) EDX spectra from  $\text{MoS}_2$ , before annealing G) XRD spectra from  $\text{MoS}_{2-x}\text{O}_x$ -GNP hybrid.



presence of 4-ATP. C) Extinction spectra from  $\text{MoS}_{2-x}\text{O}_x$ , in the presence of 4-ATP.

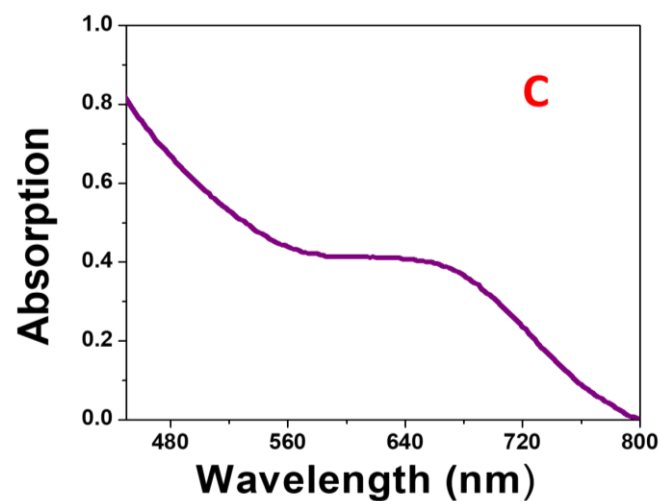
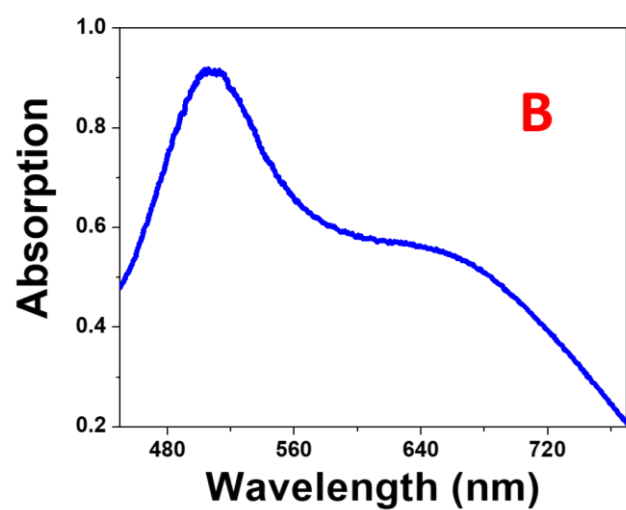


Figure S2: A) Extinction spectra from GNP in the presence and absence of 4-ATP. B) Extinction spectra from  $\text{MoS}_{2-x}\text{O}_x$ -GNP hybrid in the