Electronic Supplementary Material (ESI) for Nanoscale
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Supplementary Information

Enhancing Photocatalytic Activity of One-Dimensional $KNbO_3$ Nanowires by Au Nanoparticles Under Ultraviolet and Visible-light

Jinyao Lan,[†,‡] Xuemei Zhou,[†] Gang Liu*,[†]
Jiaguo Yu,[§] Jingchang Zhang,[‡]
Linjie Zhi,*,[†] and Guangjun Nie*,[†]

[†]National Center for Nanoscience and Technology
Beijing 100190, China

[‡]Institute of Modern Catalysis, Beijing University of Chemical Technology
State Key Laboratory of Chemical Resource Engineering
Beijing 100029, China

[§]State Key Laboratory of Advanced Technology for Materials Synthesis and Processing
Wuhan University of Technology
Wuhan 430070, China

* To whom all correspondence should be addressed.
E-mail: liug@nanoctr.cn
zhilj@nanoctr.cn
niegj@nanoctr.cn
Fax: (+86) 10-62656765
[†] National Center for Nanoscience and Technology.
[‡] Beijing University of Chemical Technology.
[§] Wuhan University of Technology.

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Figure Captions

Figure S1. SEM image of commercial bulk-like $KNbO_3$ from Alfa Asear.

Figure S2. Nitrogen adsorption and desorption isotherms measured at 77 K and BJH pore size distribution for NWs (a-b), NRs (c-d) and commercial $KNbO_3$ (e-f). The BET surface area for NWs, NRs, and commercial $KNbO_3$ is measured to be 4.8, 3.25 and 1.0 m^2/g, respectively.

Figure S3. UV-vis spectral changes of RhB aqueous solutions as a function of UV irradiation time. (a) NWs. (b) NRs. (c) Commercial. Reaction conditions: RhB concentration 1×10^{-5} M; catalyst concentration 1 g/L; 300 W Xe-lamp (UV bandpass at 365 nm, light intensity is 158 mW/cm^2).

Figure S4. UV-vis spectral changes of RhB aqueous solutions as a function of irradiation time. (a) Au 4.2 wt% on NWs under UV. (b) Au 8.0 wt% on NWs under UV. (c) Au 4.2 wt% on NWs under visible-light. (d) Au 8.0 wt% on NWs under visible-light. Reaction conditions: RhB concentration 1×10^{-5} M; catalyst concentration 1 g/L; 300 W Xe-lamp (visible-light $\lambda>420$ nm, light intensity is 230 mW/cm^2; UV bandpass at 365 nm, light intensity is 158 mW/cm^2).

Figure S5. Valence band structures for $KNbO_3$ nanostructures before and after Au deposition.

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Table S1. Comparison of photocatalytic activity of photocatalyst (NWs+Au 8 wt%) with P25 (Degussa). The reaction rate constant (k) is normalized to the specific surface area, denoted as k_s [*J. Phys. Chem. C* **2010**, *114*, 17051-17061].
$k_s = k/(\text{catalyst concentration} \times SSA)$, herein the catalyst concentration is 1g/L.

	k（min^{-1}）	SSA（m^2/g）	k_s（$min^{-1}Lm^{-2}$）
P25	0.151	50	3.02×10^{-3}
NWs+Au 8 wt%	0.0162	5.0	3.22×10^{-3}

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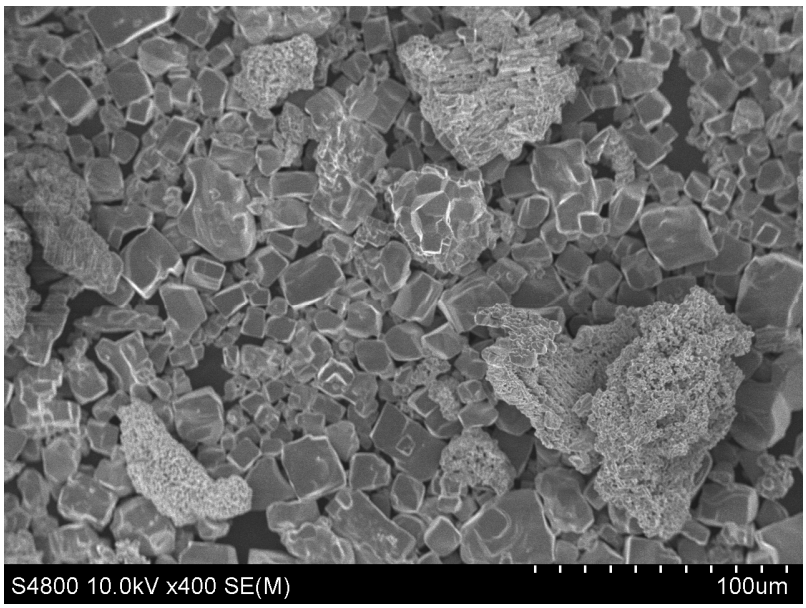

Figure S1.

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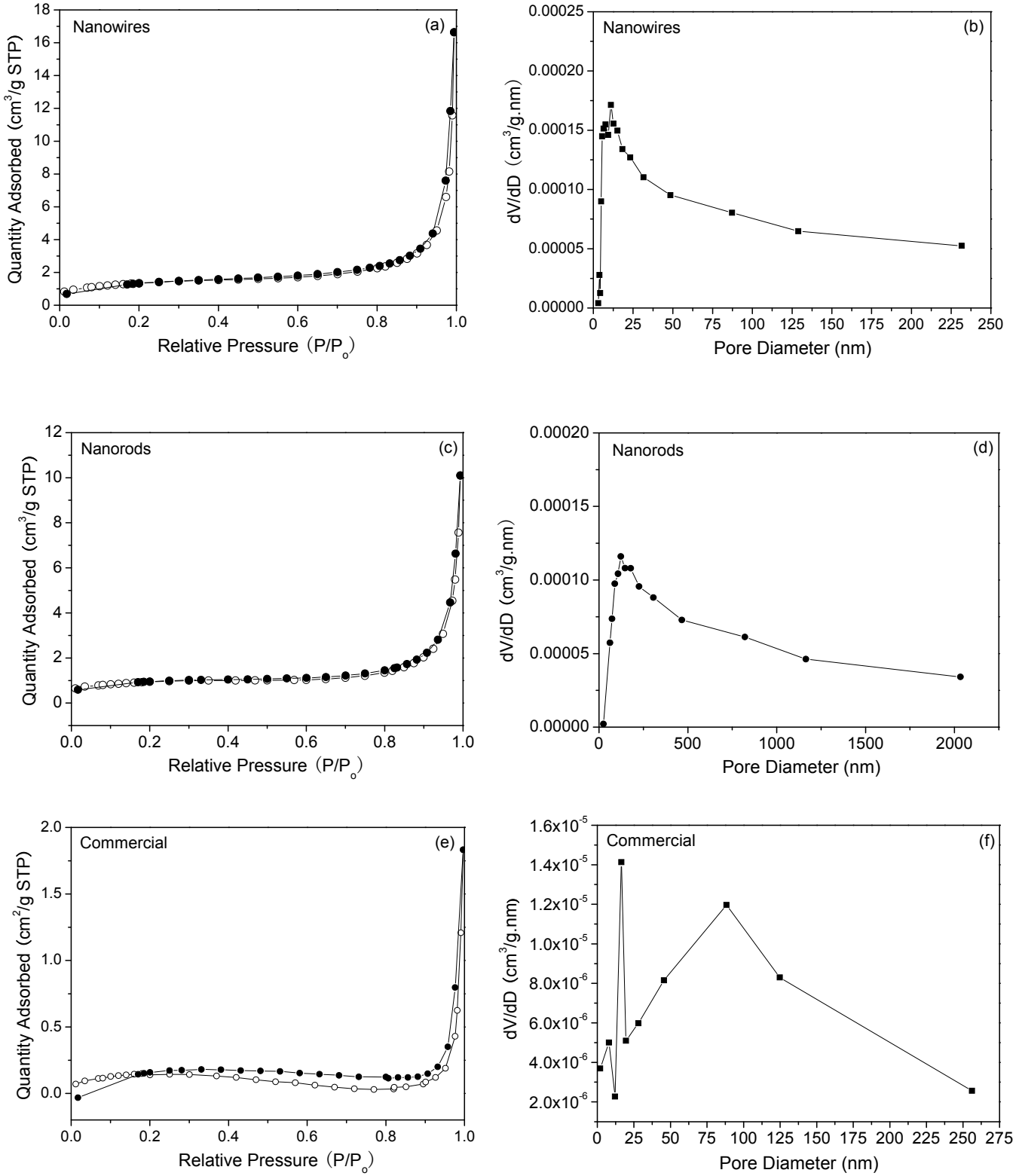

Figure S2 (a-f).

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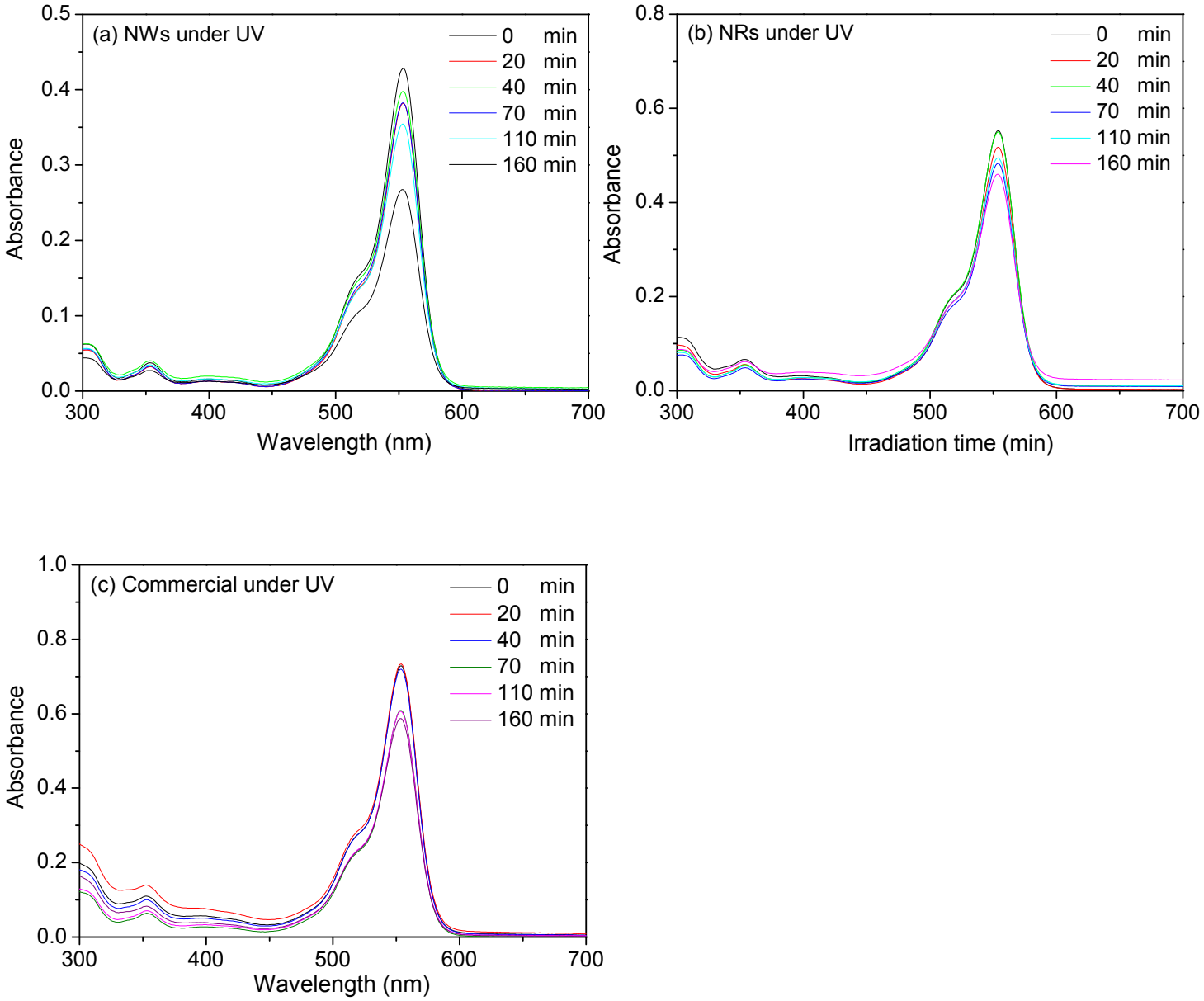
(a) NWs under UV
0 min
20 min
40 min
70 min
110 min
160 min
Absorbance
Wavelength (nm)
(b) NRs under UV
Irradiation time (min)
(c) Commercial under UV

Figure S3 (a-c).

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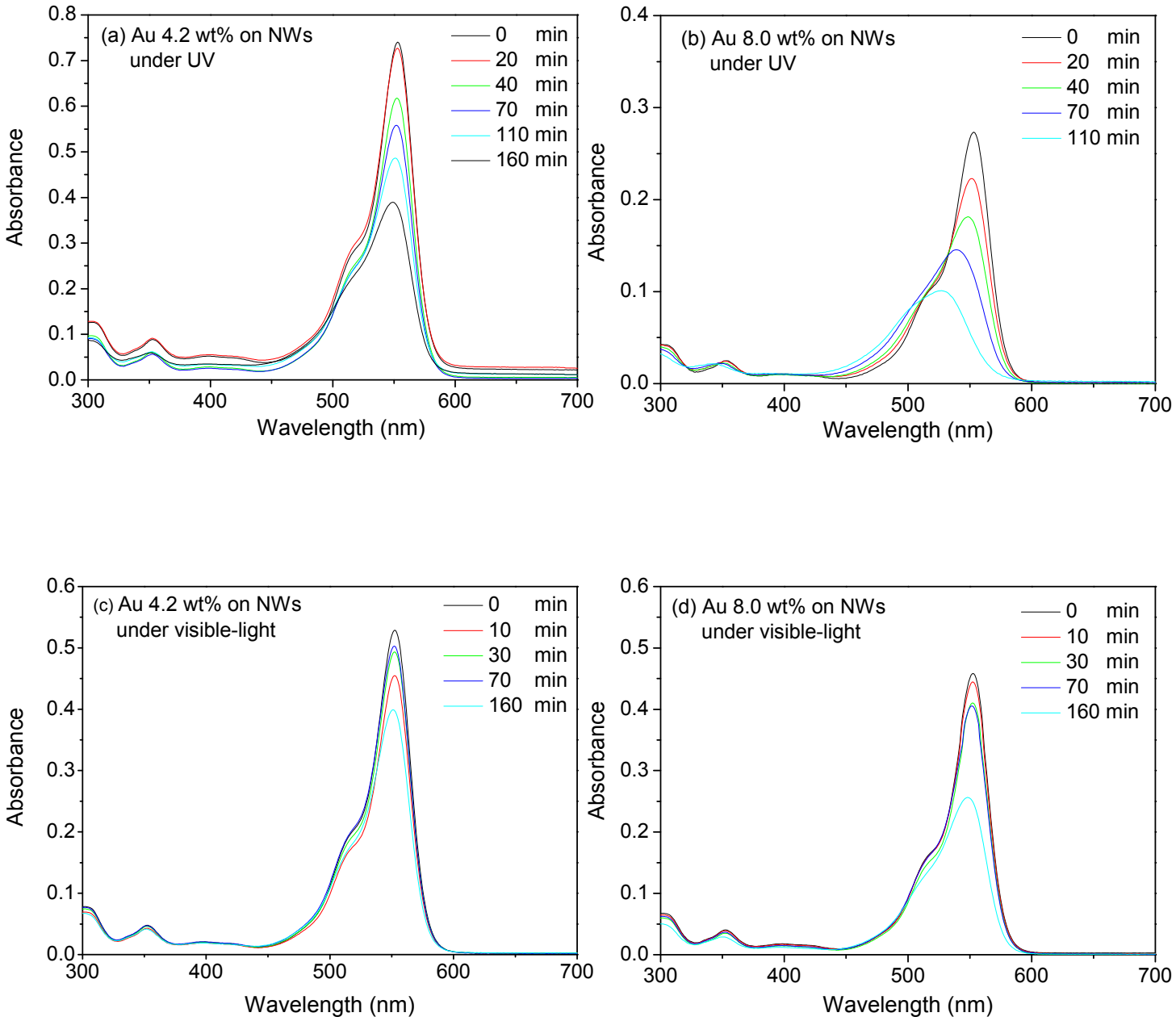

Figure S4 (a-d).

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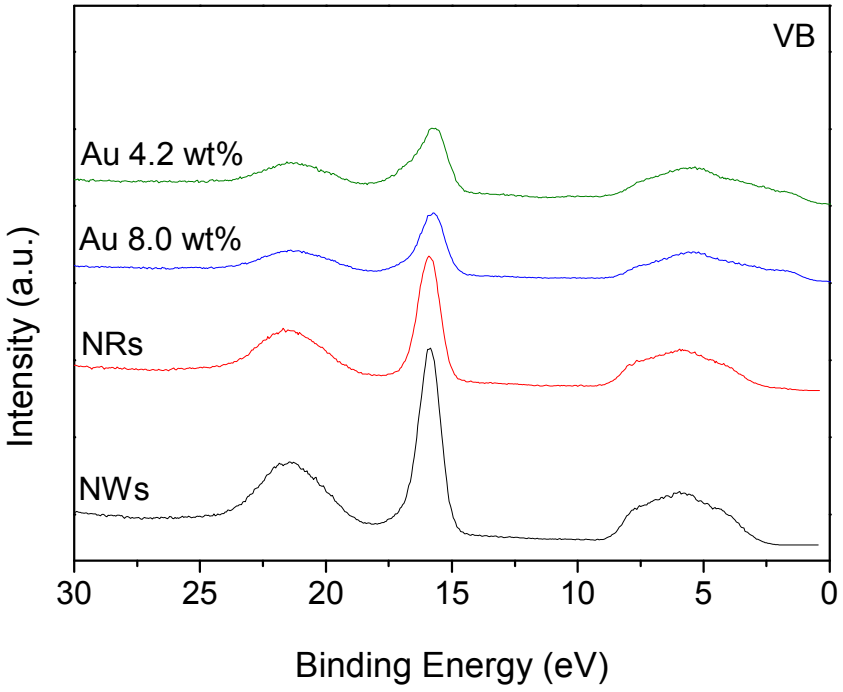

Figure S5.