

Supplementary Information for

## Highly tunable nonlinear response of Au@WS<sub>2</sub> hybrids with plasmon resonance and anti-Stokes effect

Yun-Hang Qiu,<sup>‡a</sup> Kai Chen,<sup>‡a,b</sup> Si-Jing Ding,<sup>\*a,c</sup> Fan Nan,<sup>a,d</sup> Yong-Jie Lin,<sup>a,b</sup> Jia-Xing Ma,<sup>a</sup>

Zhong-Hua Hao,<sup>a</sup> Li Zhou<sup>a</sup> and Qu-Quan Wang<sup>\*a,b</sup>

<sup>a</sup>Key Laboratory of Artificial Micro- and Nano-structures of the Ministry of Education, School  
of Physics and Technology, Wuhan University, Wuhan 430072, P. R. China

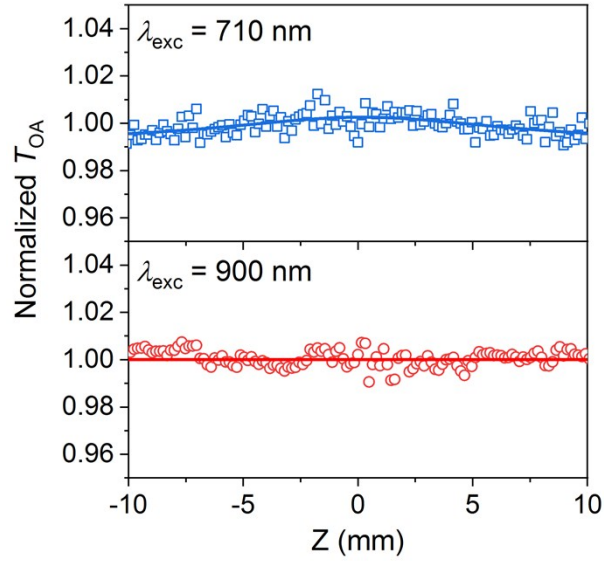
<sup>b</sup>The Institute for Advanced Studies, Wuhan University, Wuhan 430072, P. R. China

<sup>c</sup>School of Mathematics and Physics, China University of Geosciences, Wuhan 430074, P. R.  
China

<sup>d</sup>Department of Chemical and Biomolecular Engineering, Clarkson University, Potsdam, New  
York 13699, United States

<sup>‡</sup>These authors equally contributed to this work.

\* E-mail: qqwang@whu.edu.cn, dingsijing@cug.edu.cn



**Fig. S1.** Normalized open-aperture Z-scan transmittances  $T_{OA}$  of bare Au nanoparticles with the same amount of Au in Au@WS<sub>2</sub> with  $\rho_{Au:W} = 0.20$  at the excitation wavelength  $\lambda_{exc}$  of 710 nm and 900 nm. Extremely weak saturable absorption with  $\beta = -0.09$  cm/GW is observed at 710 nm, which is 1/20 of that of bare WS<sub>2</sub> nanobelts. The nonlinear absorption is hard to observe at 900 nm.