Supporting Information for

Synergetic photoluminescence enhancement of monolayer MoS_2 via surface plasmon resonance and defect repairing

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Keywords: monolayer MoS_2, photoluminescence enhancement, surface plasmon resonance, defect repairing

Contents

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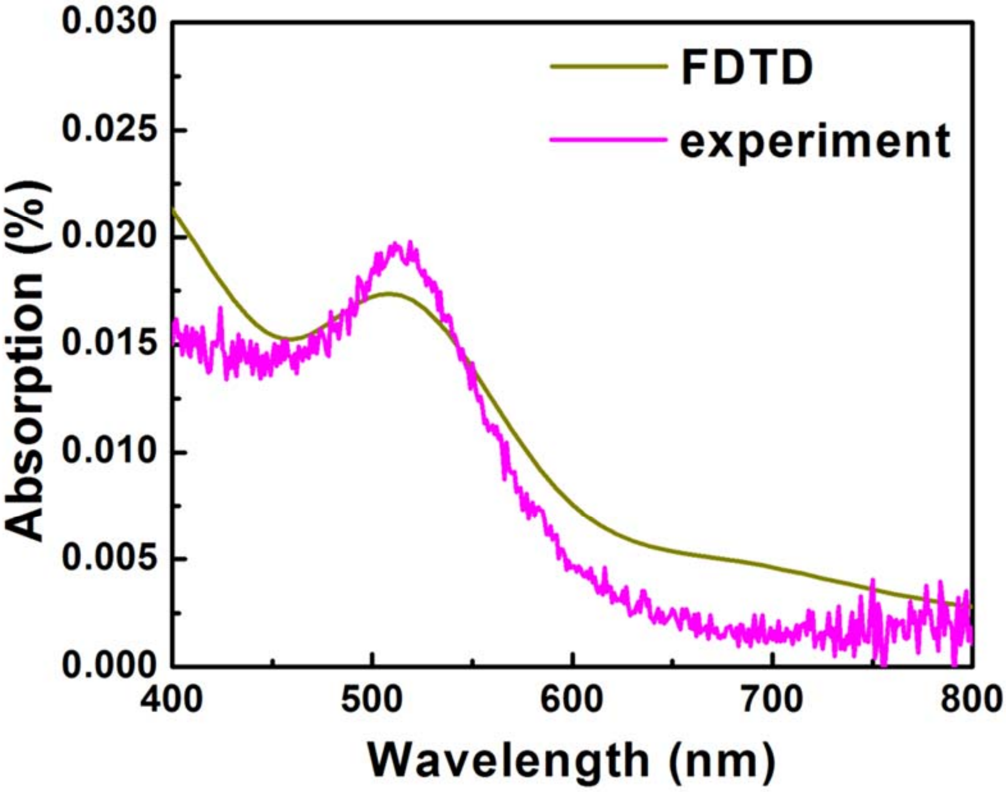

Figure S1. Absorption spectra of 10nm-Au NPs. The resonance wavelength of 10nm-Au NPs is about 520 nm, which is very close to the laser wavelength used in our experiments, 532 nm.

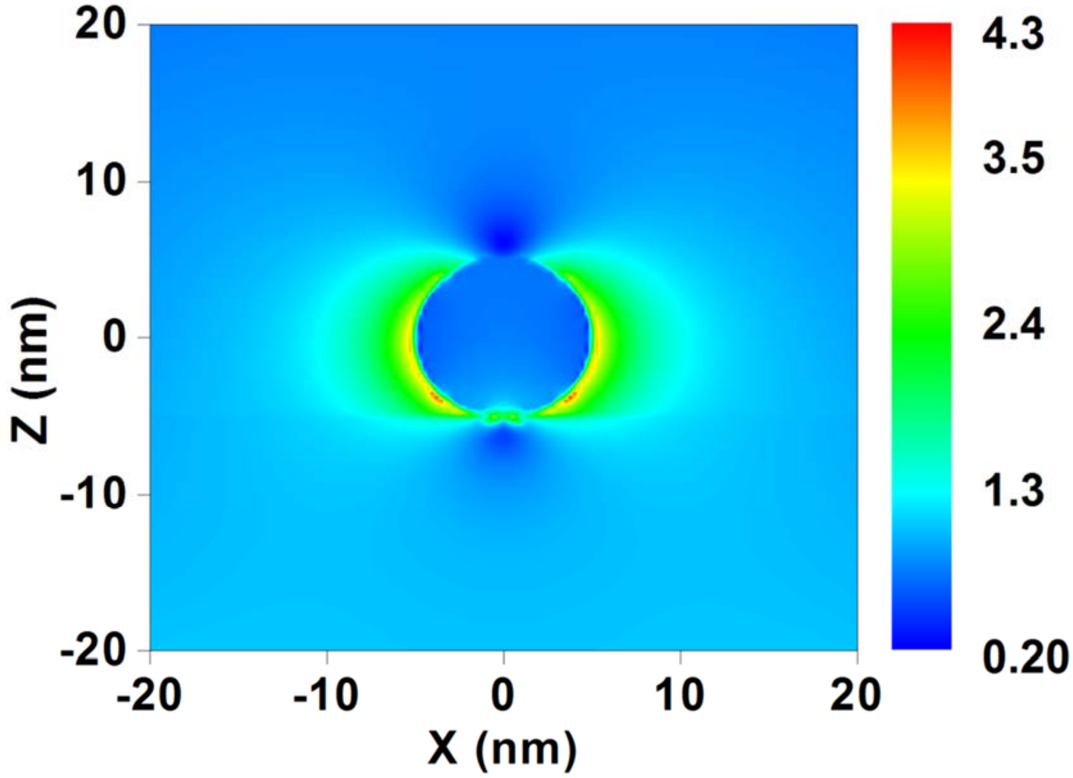

Figure S2. Local electric field distribution of Au NPs by FDTD simulations.

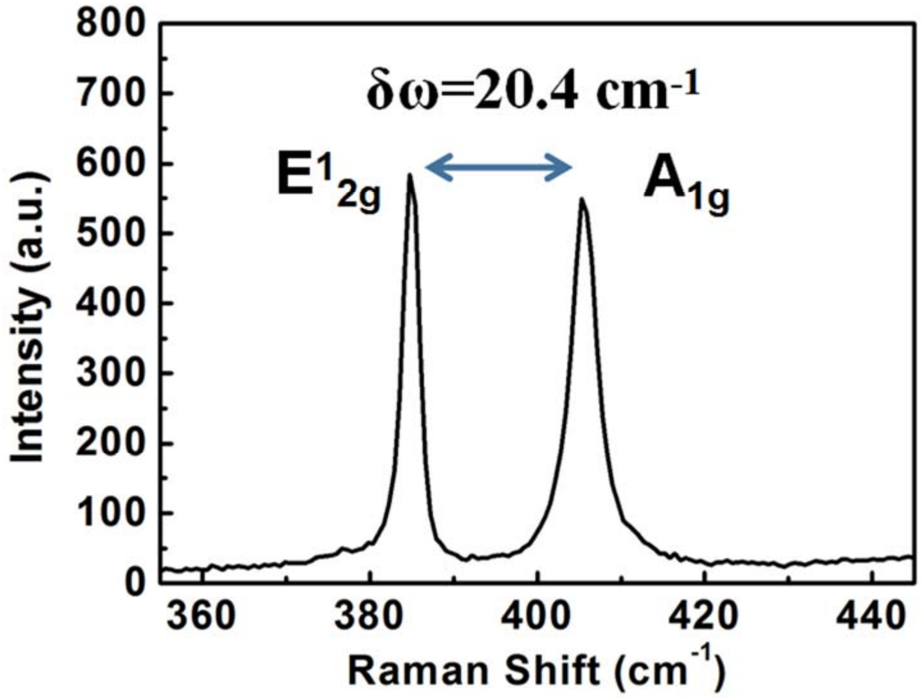

Figure S3. Raman spectrum of a CVD-grown MoS_2 monolayer. The differential between the E^1_{2g} peak and the A_{1g} peak is 20.4 cm^{-1}, which confirms a single layer MoS_2.

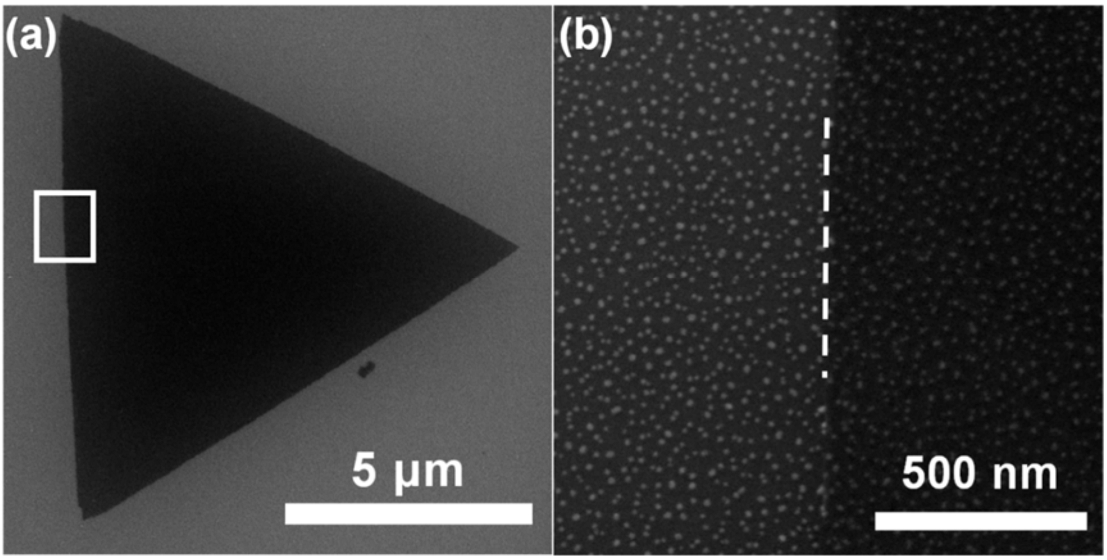

Figure S4. SEM image of TFSI treated MoS_2 on Au NPs. (a) SEM image of TFSI treated MoS_2 on Au NPs. (b) The magnified SEM image of the white region in panel (a). The boundary of MoS_2 membrane was indicated by a white dash line.

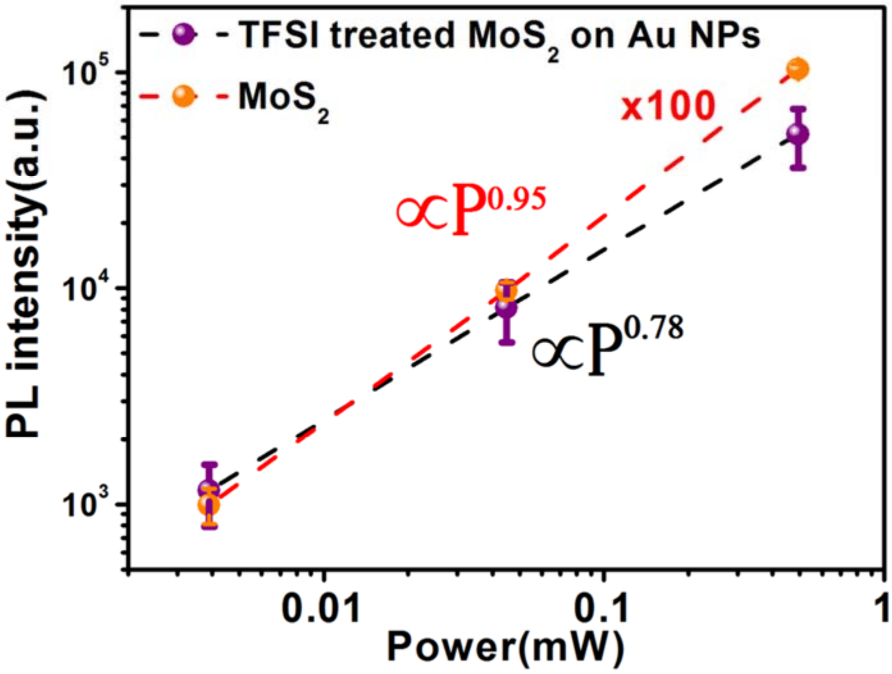

Figure S5. Pump-power dependence of the PL intensity for pristine MoS_2 and TFSI treated MoS_2 on Au NPs. For contrast, the pump-power dependence of the PL intensity of MoS_2 was enlarged 100 times.

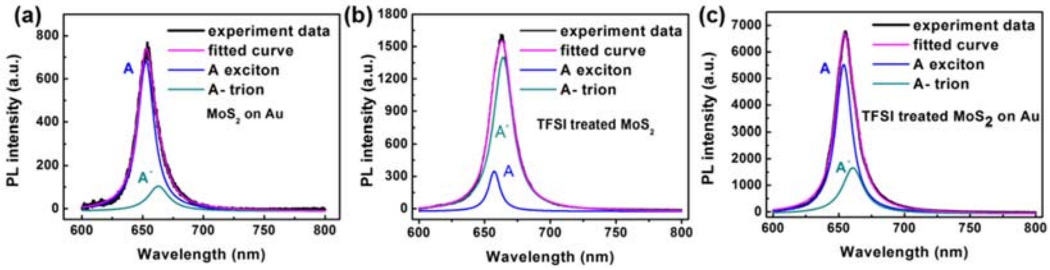

Figure S6: PL spectra of MoS_2 on Au NPs, TFSI treated MoS_2 and TFSI treated MoS_2 on Au NPs with fitting curves. (a) PL spectra of MoS_2 on Au NPs. (b) PL spectra of TFSI treated MoS_2. (c) PL spectra of TFSI treated MoS_2 on Au NPs. The PL spectra from B excitons are so weak and we could ignore them.

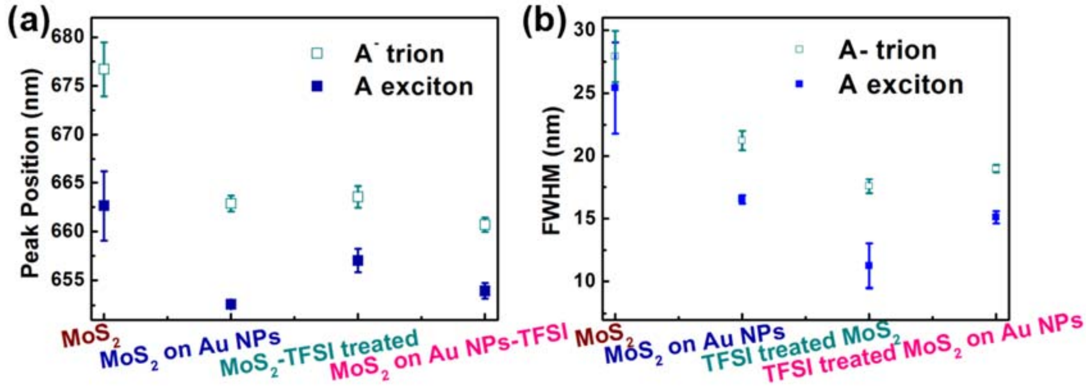

Figure S7: The statistics of peak position and FWHM of A excitons and A- trions from the fitting curves. (a) Peak positions of A excitons and A- trions. (b) FWHM of PL spectra of A excitonos and A- trions.