

Supporting Information

Near-Field Exciton Imaging of Chemically Treated MoS₂ Monolayers

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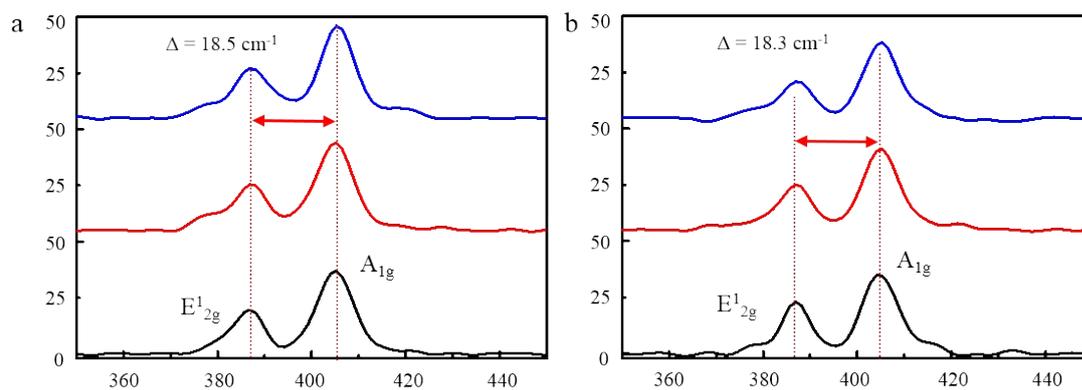


Figure S1. Raman spectra at three locations in sample #2 (a) and sample #3 (b). Difference between E_{2g}^1 and A_{1g} peak for MoS_2 was observed to be 18.5 and 18.3 cm^{-1} , respectively, which confirms the monolayer thickness of our samples.

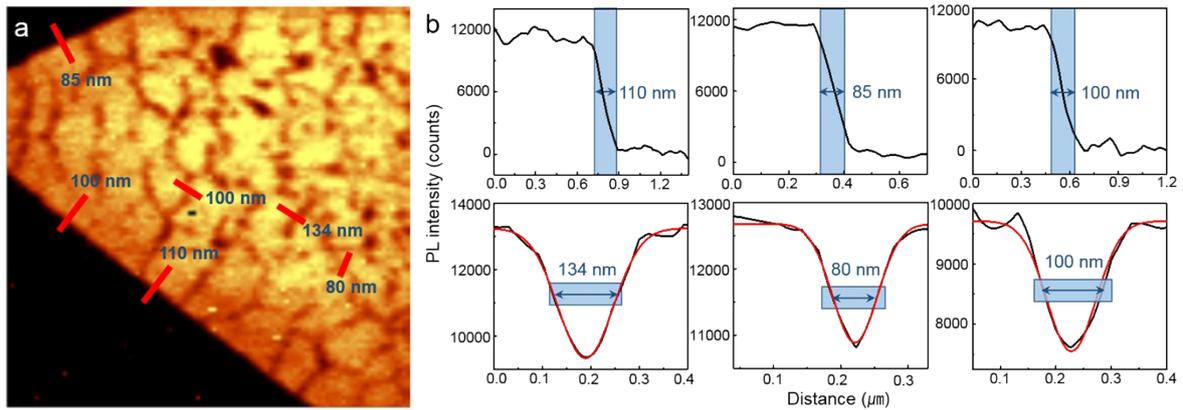


Figure S2. (a) Near-field (NF) PL image of 1L-MoS₂ (b) Cross sectional line profile across selected edges and line defects. For the edge line profile, the spatial resolution of NF PL imaging were measured based on the distance between the positions corresponding to 12% and 88% of the PL intensity. For the line profile across line defects, spatial resolution was estimated by FWHM of fitted Gaussian curve.

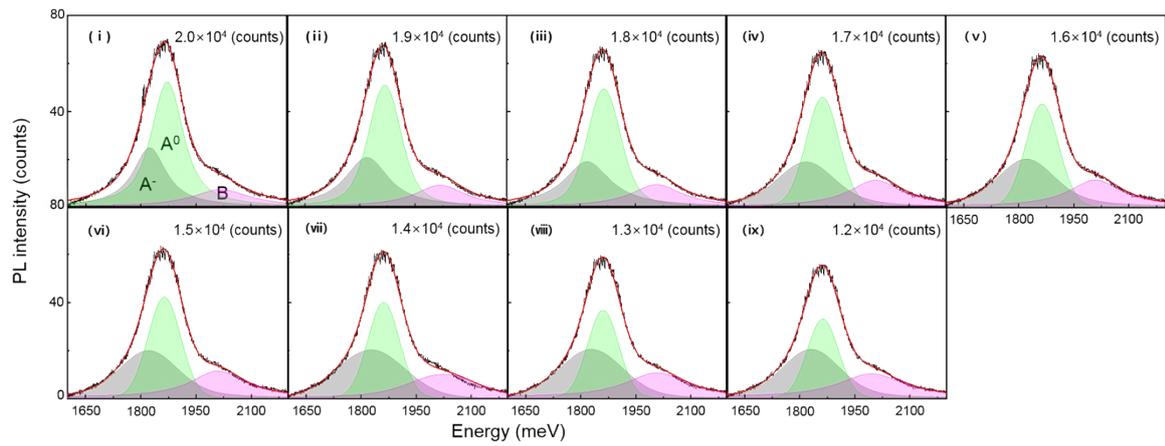


Figure S3. Average PL spectra for each intensity level after the intensities of PL spectra at all 2500 pixels were categorized into 9 levels according to their total PL intensity counts.. Intensity levels are shown in the figures. Black line: experimental data, red line: fitting curve, green: A^0 , gray: A^- , pink: B

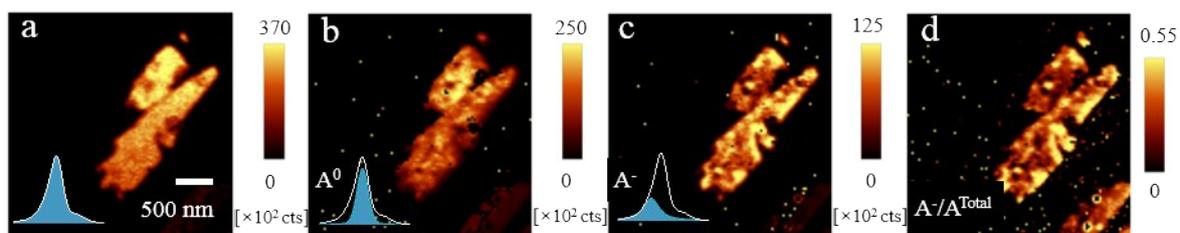


Figure S4. NF PL images of exfoliated 1L-MoS₂. (a) Total integrated intensity, (b) A⁰ emission profile, (c) A⁻ emission profile, and (d) map of A⁻ to A^{total} intensity ratio.

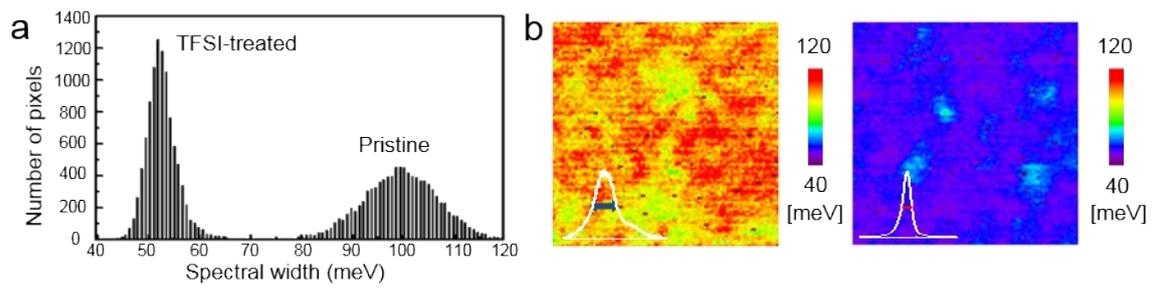


Figure S5. (a) Histogram of spectral widths of local PL spectra of 1L-MoS₂ before and after TFSI treatment. (b) Maps of spectral widths of local PL spectra of 1L-MoS₂ before (left panel) and after (right panel) TFSI treatment.

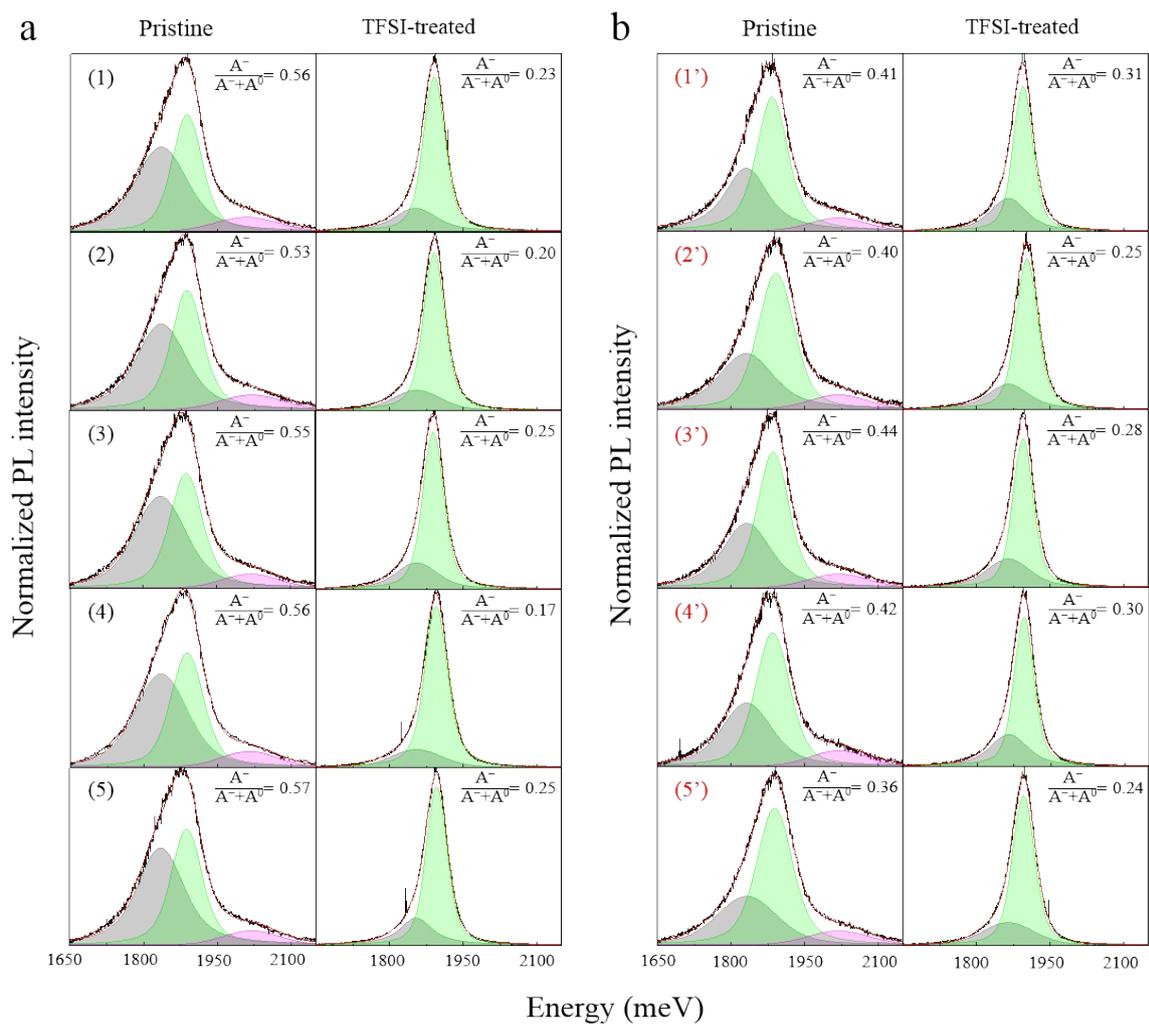


Figure S6. (a) Average PL spectra from 5 defect regions before (left panel) and after TFSI treatment (right panel). (b) Average PL spectra from 5 clean regions before (left panel) and after TFSI treatment (right panel). Black line: experimental data, red line: fitted curve, green curve: A^0 , gray curve: A^- , pink curve: B emissions. A^-/A^{total} for each curve is shown.

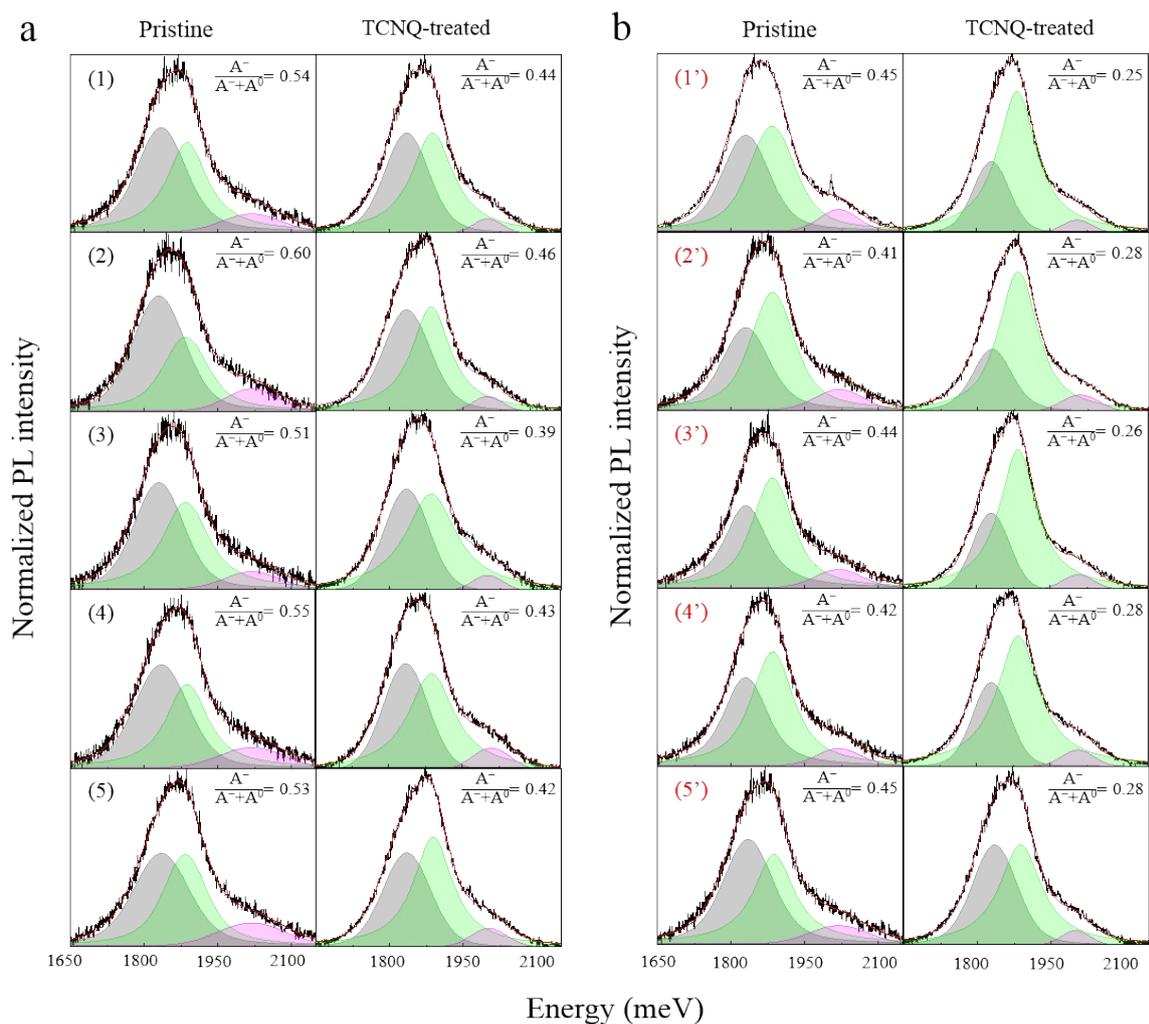


Figure S7. (a) Average PL spectra from 5 defect regions before (left panel) and after TCNQ treatment (right panel). (b) Average PL spectra from 5 clean regions before (left panel) and after TCNQ treatment (right panel). Black line: experimental data, red line: fitted curve, green curve: A^0 , gray curve: A^- , pink curve: B emissions. A^-/A^{total} for each curve is shown.

		Defect region 1	Defect region 2	Defect region 3	Defect region 4	Defect region 5	Clean region 1	Clean region 2	Clean region 3	Clean region 4	Clean region 5
Pristine- MoS₂	A ⁻ intensity (counts)	12700	11600	12000	11800	12800	11000	9850	9920	9700	8800
	A ⁰ intensity (counts)	9900	10000	9800	9200	9600	15900	15000	12700	13400	15500
	A ⁻ /A ^{total}	0.56	0.53	0.55	0.56	0.57	0.41	0.40	0.44	0.42	0.36
TFSI- treated	A ⁻ intensity (counts)	5240	5150	5500	3670	6250	9890	9300	9300	9250	7950
	A ⁰ intensity (counts)	17600	20600	16300	17500	18750	22000	28000	24000	22000	25000
	A ⁻ /A ^{total}	0.23	0.20	0.25	0.17	0.25	0.31	0.25	0.28	0.30	0.24
	$\Delta \frac{A^-}{A^{Total}}$	0.33	0.33	0.31	0.39	0.32	0.10	0.15	0.14	0.12	0.12

Table 1. Integrated intensities of A⁰ and A⁻ peaks, the value of A⁻/A^{total} and the change in A⁻/A^{total} for all five clean regions and defect regions of pristine and TFSI-treated sample.

		Defect region 1	Defect region 2	Defect region 3	Defect region 4	Defect region 5	Clean region 1	Clean region 2	Clean region 3	Clean region 4	Clean region 5
Pristine-MoS₂	A ⁻ intensity (counts)	4450	4650	4200	4350	4000	3880	3660	3580	3700	3750
	A ⁰ intensity (counts)	3800	3100	3960	3550	3520	4750	5200	4500	5050	4560
	A ⁻ /A ^{total}	0.56	0.60	0.51	0.55	0.53	0.45	0.41	0.44	0.42	0.45
TFSI-treated	A ⁻ intensity (counts)	4250	4430	3940	4270	4230	3700	3540	3200	3670	3590
	A ⁰ intensity (counts)	5450	5210	6160	5700	5870	10900	9150	9000	9400	9200
	A ⁻ /A ^{total}	0.44	0.46	0.39	0.43	0.42	0.25	0.28	0.26	0.28	0.28
	$\Delta \frac{A^-}{A^{Total}}$	0.10	0.14	0.12	0.12	0.11	0.20	0.13	0.18	0.14	0.17

Table 2. Integrated intensities of A⁰ and A⁻ peaks, the value of A⁻/A^{total} and the change in A⁻/A^{total} for all five clean regions and defect regions of pristine and TCNQ-treated sample.