Supporting Information

Near-Field Exciton Imaging of Chemically Treated MoS$_2$ Monolayers

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Figure S1. Raman spectra at three locations in sample #2 (a) and sample #3 (b). Difference between $E_{12g}$ 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-MoS$_2$ (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-MoS$_2$. (a) Total integrated intensity, (b) $A^0$ emission profile, (c) $A^-$ emission profile, and (d) map of $A^-$ to $A^\text{total}$ intensity ratio.
Figure S5. (a) Histogram of spectral widths of local PL spectra of 1L-MoS\textsubscript{2} before and after TFSI treatment. (b) Maps of spectral widths of local PL spectra of 1L-MoS\textsubscript{2} 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. $A^-/A^{\text{total}}$ for each curve is shown.
<table>
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<tr>
<th>Defect region 1</th>
<th>Defect region 2</th>
<th>Defect region 3</th>
<th>Defect region 4</th>
<th>Defect region 5</th>
<th>Clean region 1</th>
<th>Clean region 2</th>
<th>Clean region 3</th>
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**Table 1.** Integrated intensities of $A^0$ 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.
Table 2. Integrated intensities of $A^0$ 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.