Supplementary Materials

Quantum plasmonic two-dimensional heterojunction of WS_2-MoS_2

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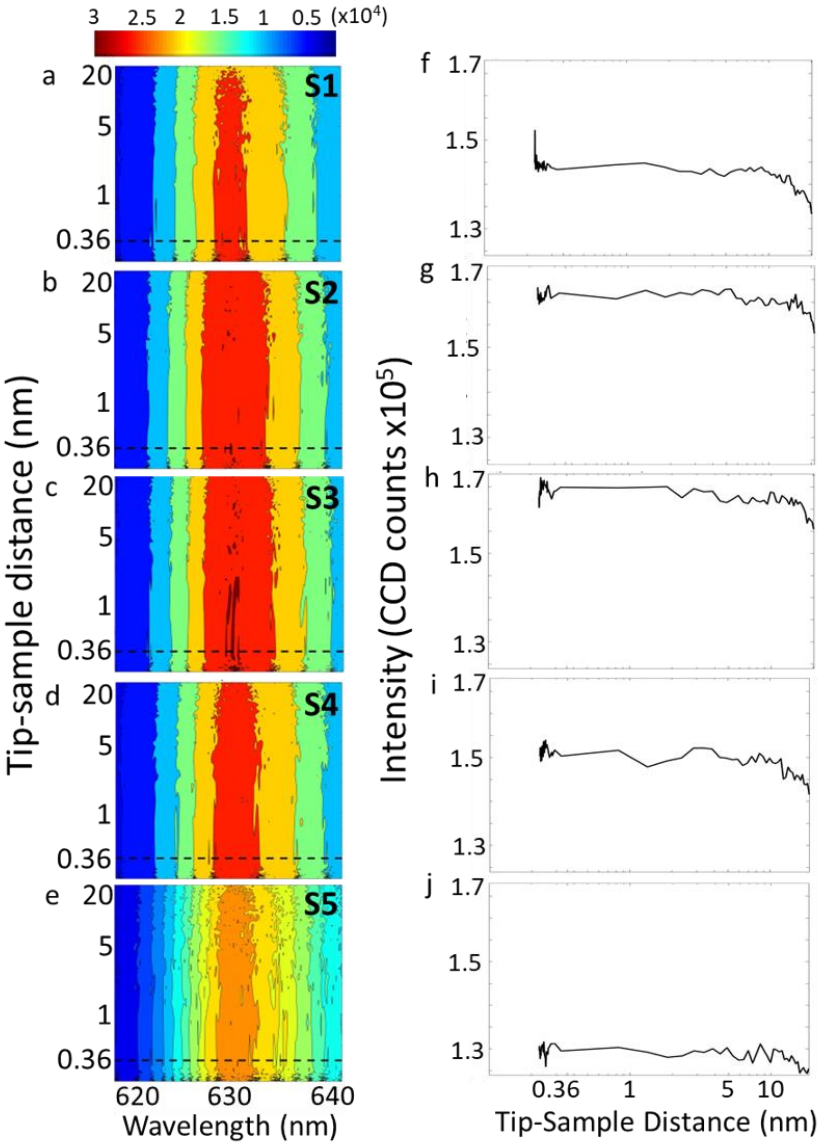

Figure S1. Tip-sample distance dependence TEPL measurements. Fig 2a-2e shows 2D contour plots showing tip-sample distance measurements with 0.2nm ≤ d ≤ 20nm as a function of wavelength on 5 spots. 2a-2b are the spots on the WS_2 side of heterostructure, very close to junction. As the tip goes from 20 nm to 0.36 nm, no significant change in intensities is observed in spot 1 and spot 2 as observed by 2a, 2b and their corresponding enhancement factors 2f and 2g. At spot 3, a significant enhancement is observed in PL is observed (2c and 2h) as the tip goes at 1nm distance from the sample due to the hot electron enhancement mechanism in MoS_2. Spot 4 and spot 5 show slight enhancement as we go from heterojunction towards MoS_2 as seen in 2d-2e. The TEPL intensity spectra at all 5 spots are also shown from k-o in 2d-2e. The TEPL intensity spectra at all 5 spots are also shown from k-o.

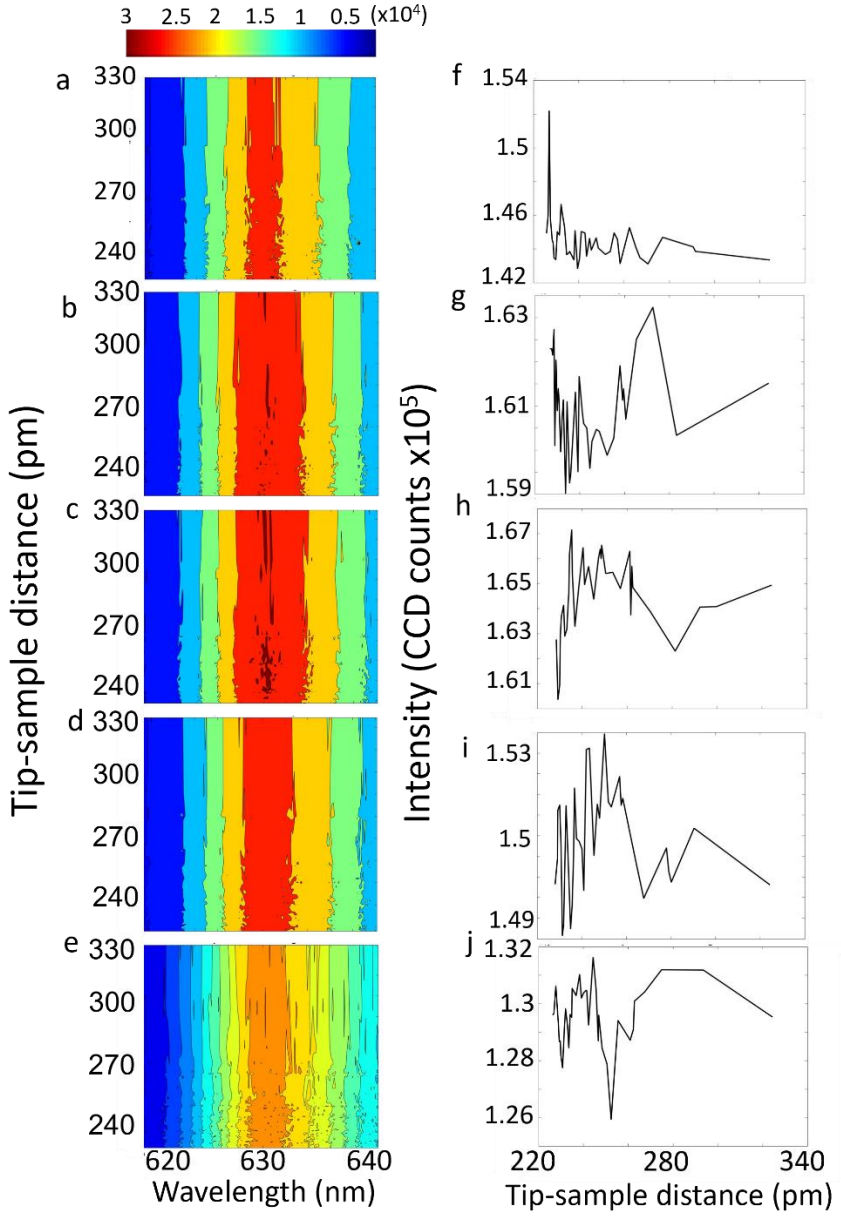

Figure S2. Tip-sample distanced measurements in the quantum regime. At the heterojunction the tip-sample distance measurements are done with d <320 pm, referred as quantum plasmonic regime on spots 1 thru 5.