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Defect band emission enhancement and inhomogeneous linewidth narrowing of monolayer WSe_2 on Ag nanotriangle arrays[1] ALEXANDER D JOHNSON, FEI CHENG, YUTSUNG TSAI, CHIH-KANG SHIH, Univ of Texas, Austin — The photoluminescence of CVD grown monolayer WSe_2 flakes was modified by transferring them onto an array of Ag nanotriangles that were created using colloidal lithography. Using low temperature (7K) micro-PL mapping and correlating it with SEM images, a 10 fold enhancement of the defect band emission and a suppression of the exciton emission of the WSe_2 flakes on the Ag nanotriangles was observed compared to the flakes on the bare substrate, showing that the dynamics of the free and defect bound excitons within the material respond differently to interactions with the plasmonic structures. Furthermore, a significant decrease in the inhomogeneous linewidth of the enhanced defect band emission was seen, resulting from the limited amount of overlap between the defect-laden regions of the WSe_2 and the plasmonic modes of the Ag nanotriangles. Due to the scalability of both the CVD growth of the WSe_2 and the fabrication method of the Ag nanotriangle array, many flakes were able to be studied and the consistency of these results was demonstrated.

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Alexander D Johnson
Univ of Texas, Austin

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