

Arrays nano-light-mixers for enhanced broadband and omnidirectional absorption of the solar radiation for thin-film silicon photovoltaics

Supplementary information

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SI1: Absorptivity spectra of NLM arrays, LF arrays and NP arrays for selected AOI values

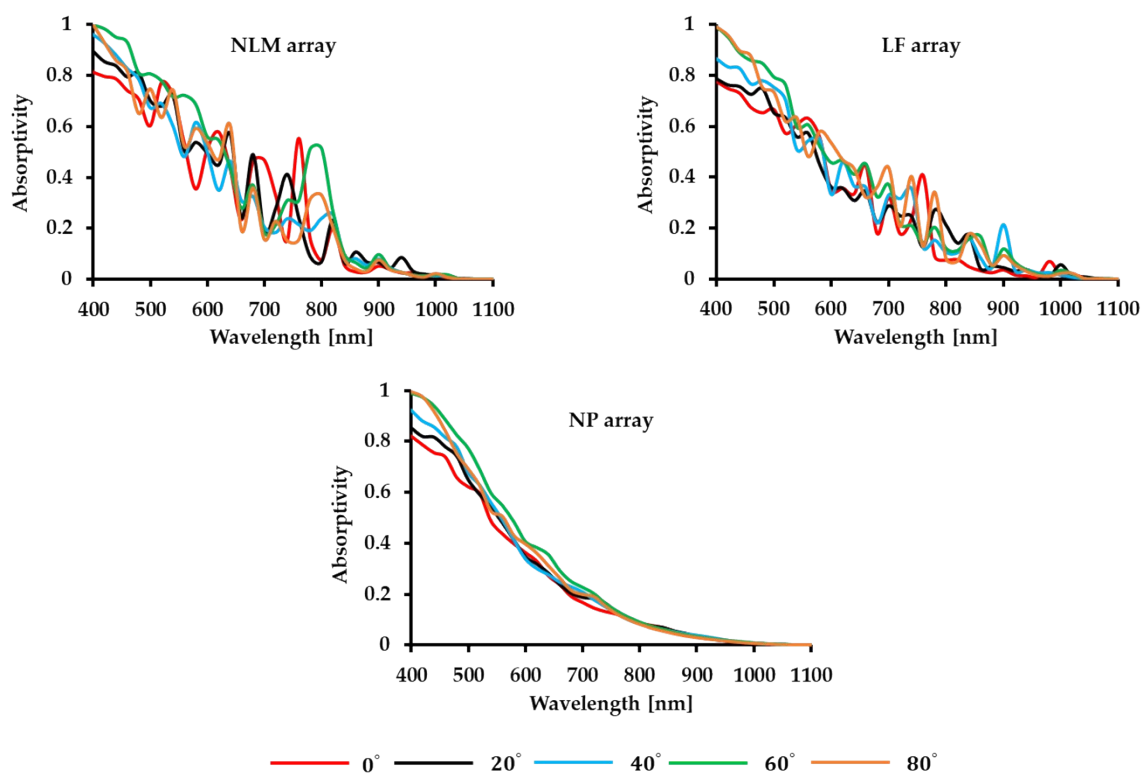
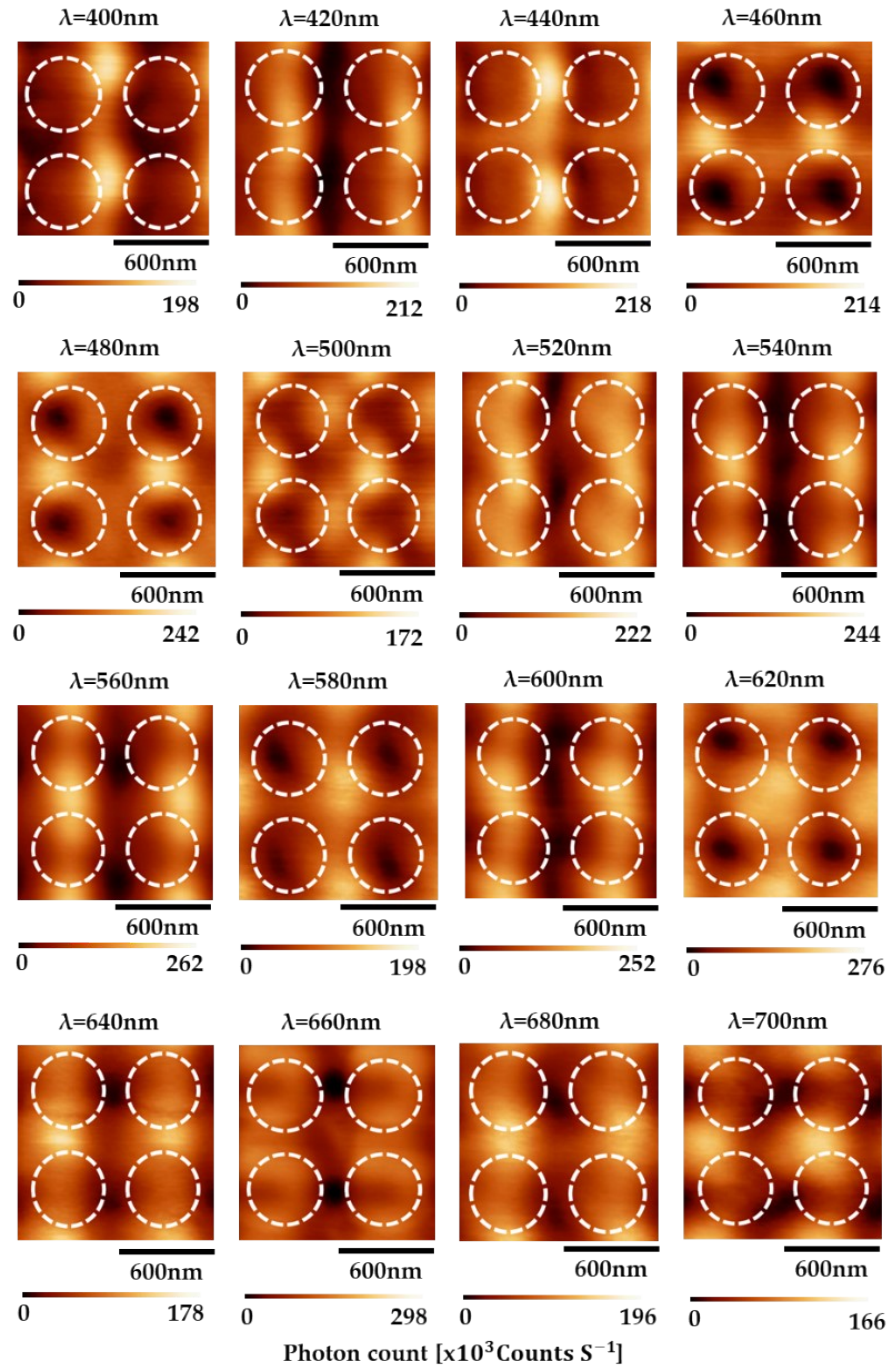


Figure SI1. Absorptivity spectra for selected AOI values of a NP, LF and NLM arrays.

SI2: Far-field NSOM microscopy images for reflection spectra ($P=600$ nm)

(a)

NLM array, $P = 600\text{nm}$, $D_t = 550\text{nm}$, $D_b = 320\text{nm}$



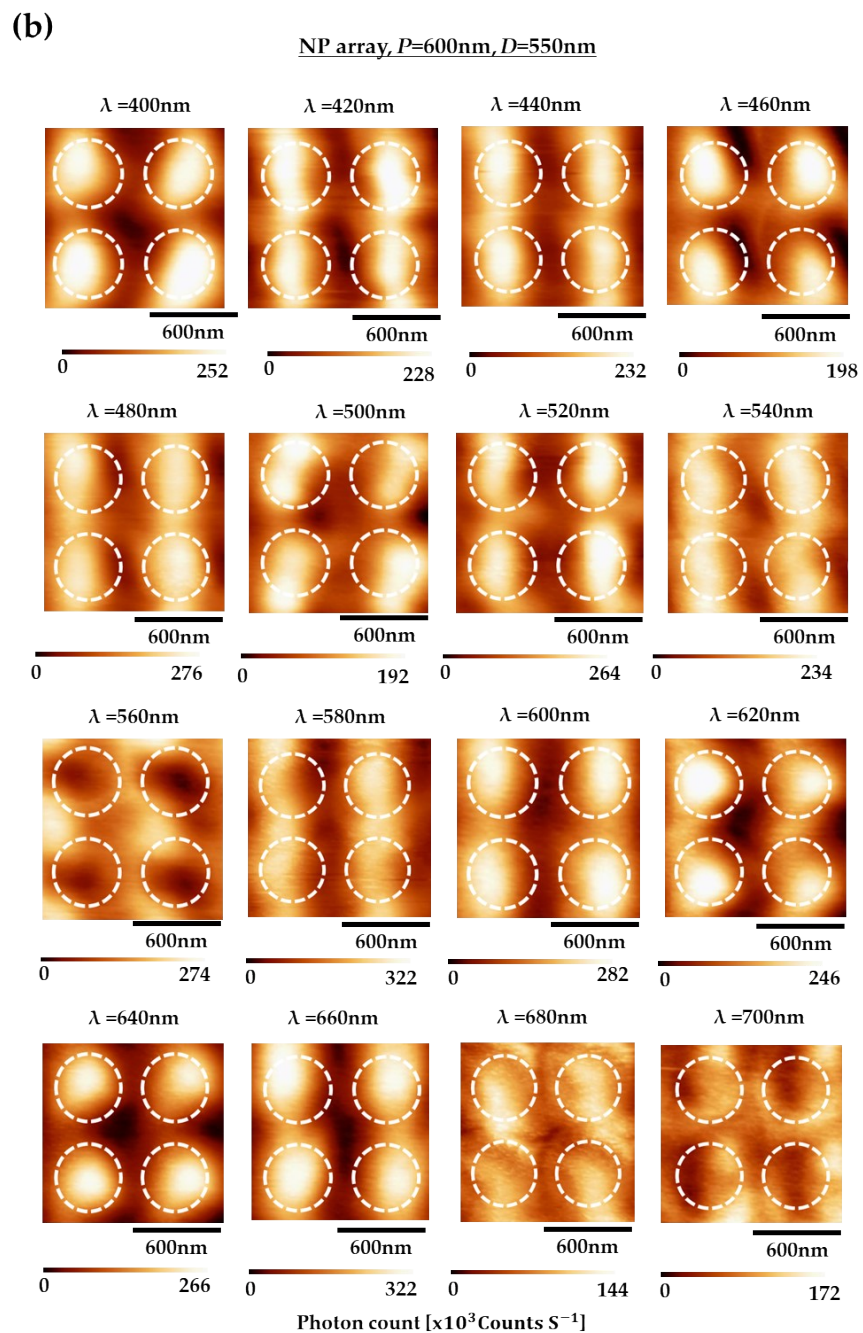


Figure S12. (a) NSOM far-field microscopy for NLM arrays. (b) NSOM far-field microscopy for NP arrays. The location of the structures is marked with dashed white lines.

SI3: Non-scaled far-field NSOM images

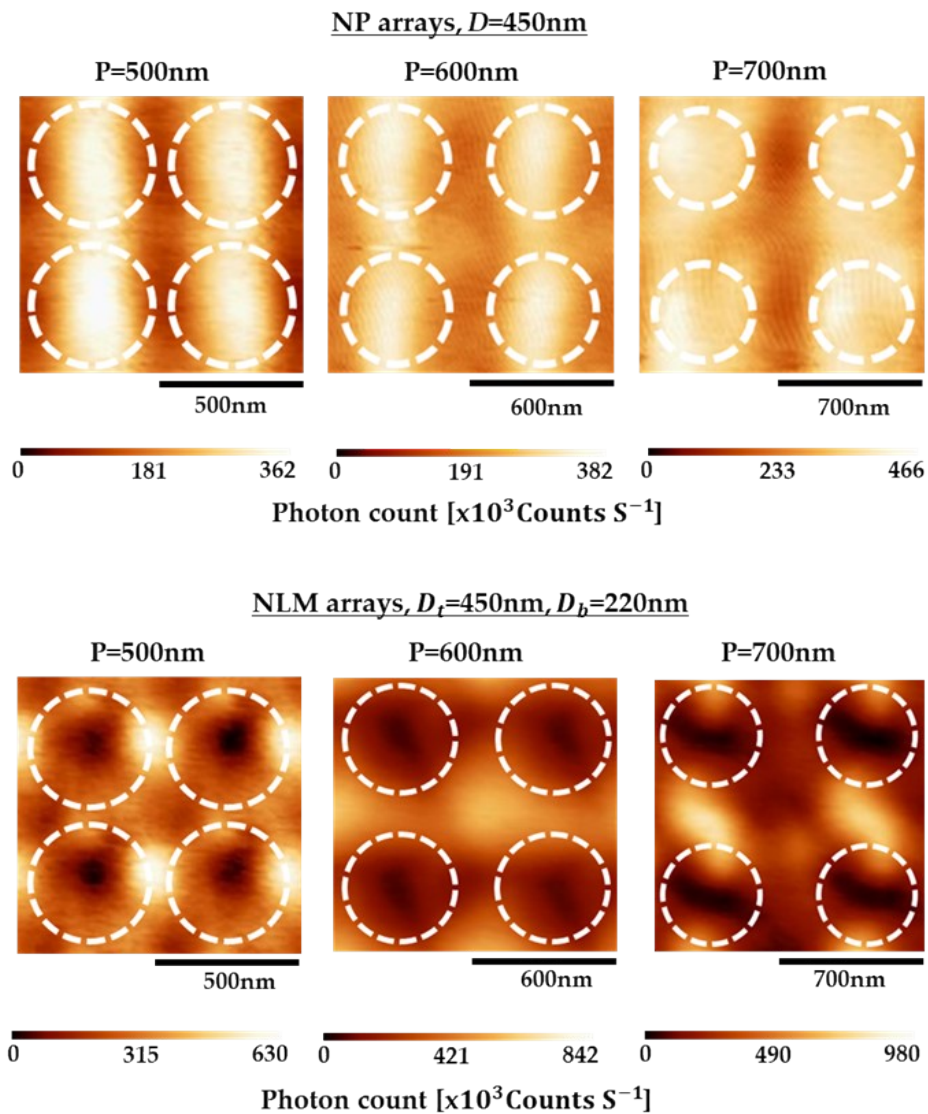
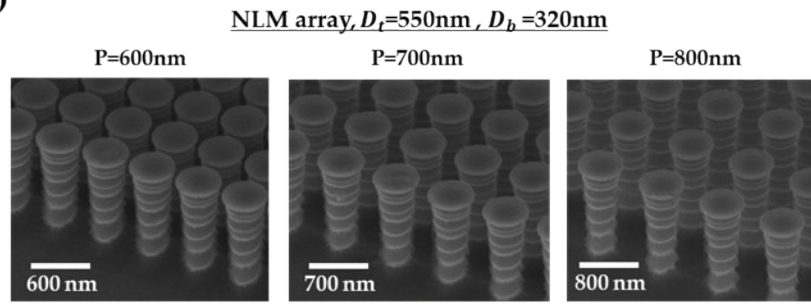


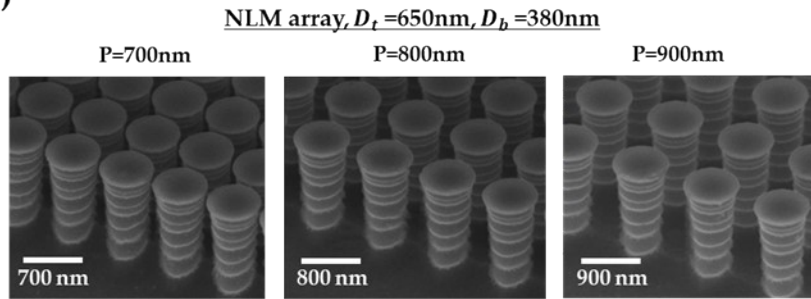
Figure SI3. NSOM near-field measurements for NP and NLM arrays. The location of the dielectric is marked with dashed white lines.

SI4: Far-field NSOM for NLM of various periods

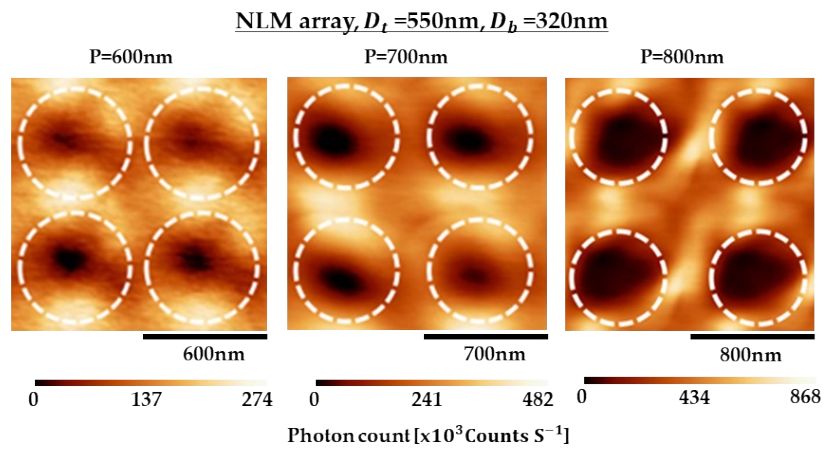
(a)



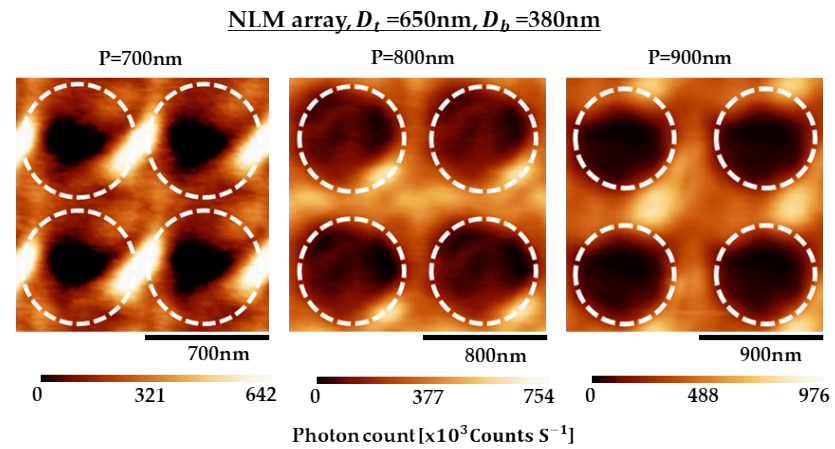
(b)



(c)



(d)



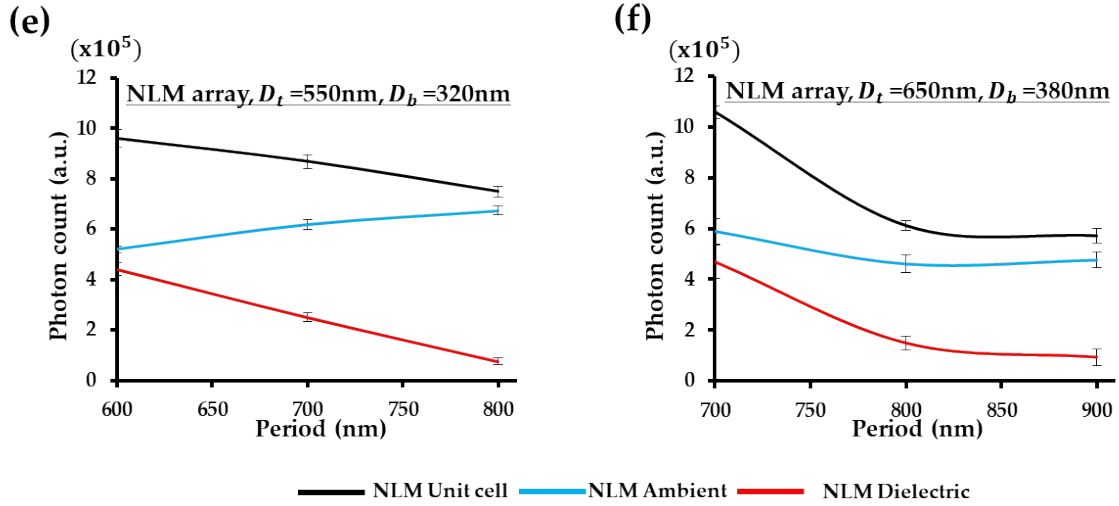


Figure SI4. (a) SEM images of NLM arrays for $P=600, 700$ and 800 nm, $D_t=550$ nm, and the NLM array with $D_b=320$ nm. (b) SEM images of NLM arrays for $P=700, 800$ and 900 nm, $D_t=650$ nm, and the NLM array with $D_b=380$ nm. (c) NSOM far-field measurements for NLM arrays for top and bottom diameter $D_t=550\text{nm}$ and $D_b=320\text{nm}$. (d) NSOM far-field measurements for NLM arrays for top and bottom diameter $D_t=650\text{nm}$ and $D_b=380\text{nm}$. The location of the dielectric is marked with dashed white lines. (e) and (f) NSOM far-field count vs. array period for NLM arrays. Each data point is an average of four unit cells and the error bars are the respective standard deviations.

SI5: Non-scaled Near-field NSOM images

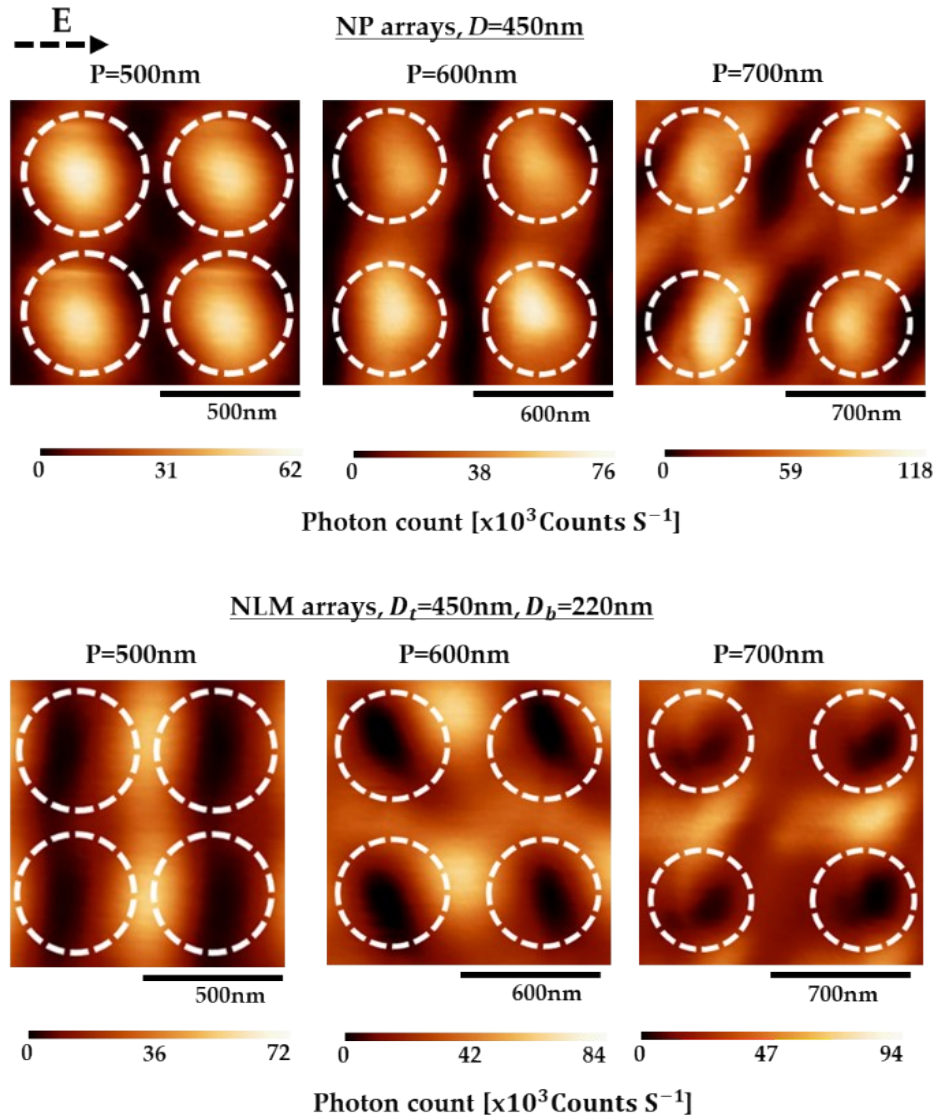


Figure SI5. NSOM near-field measurements for NP and NLM arrays. The location of the dielectric is marked with dashed white lines.

SI6: Near-field NSOM for NLM of various periods

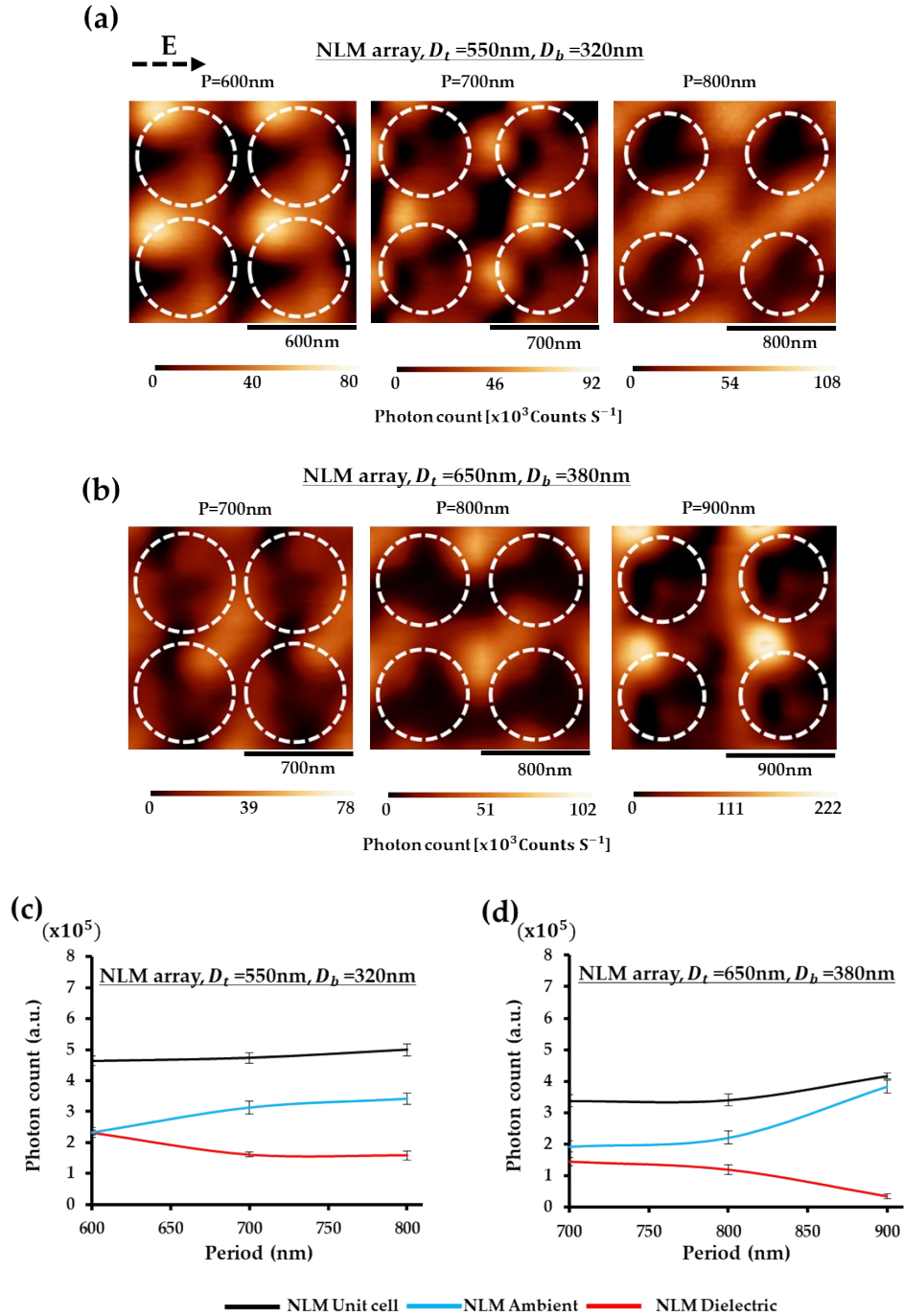


Figure SI6. (a) NSOM Near-field measurements for NLM arrays for top and bottom diameter $D_t=550\text{nm}$ and $D_b=320\text{nm}$. (b) NSOM far-field measurements for NLM arrays for top and bottom diameter $D_t=650\text{nm}$ and $D_b=380\text{nm}$. The location of the dielectric is marked with dashed white lines. (c) and (d) NSOM far-field count vs. array period for NLM arrays. Each data point is an average of four unit cells and the error bars are the respective standard deviations.