Ultra-high Absorption Efficiency of InN Nanowires with A Wide Bandwidth in The Short-wave Infrared Range

Support Information

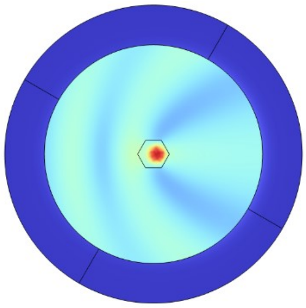

Figure S1. The magnetic field intensity $|H|$ of 1st enhanced peak with D = 320nm at λ=1200nm under TM polarization.

Figure S1 depicts a distribution diagram of the magnetic field intensity $|H|$ that makes this phenomenon more apparent. This figure demonstrates that the first enhancement in absorption associated with the TM polarized incidence arises from the resonance of the focus effect.

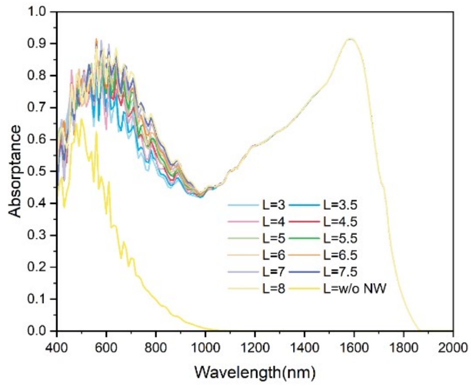

Figure S2. Absorptance with the various thicknesses of Si substrate ranging from 3 – 8 um, as NW arrays integrated on it.

The absorptance A(λ) dependence on the λ with diverse heights of Si substrate under TE polarized incidence exhibits that the Si substrate has negligible absorption beyond 1000nm and essentially no absorption after 1100nm, corresponding to the Si absorption cut-off wavelength. Furthermore, it appears that the thickness of the substrate has minimal impact on the absorption characteristics of the NW arrays.

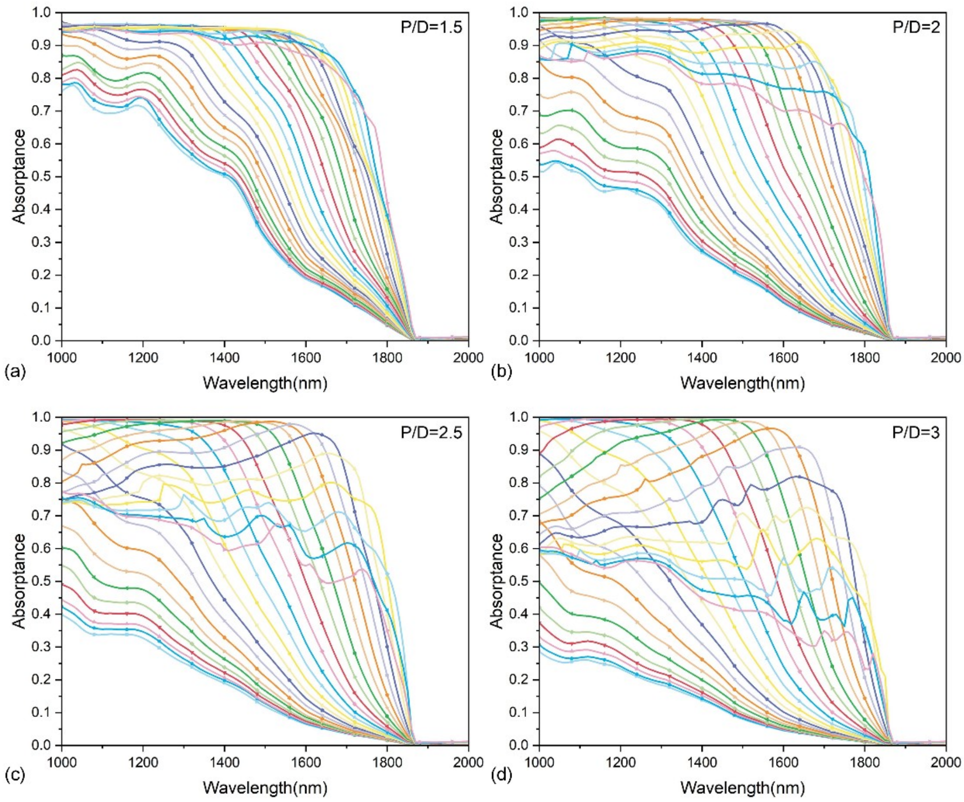

Figure S3. (a)~(d) Absorptance of NW arrays under TM polarized light with the variation of P/D ranging from 1.5-3 for NW array, and the NW height H is 3um.

The absorbance of NW arrays under TM-polarized light is similar to that under TE-polarized light. As the ratio of *P/D* grows, there is a corresponding increase in the maximum achievable absorptance, which approaches a value of unity. For each P/D ratio, as the diameter increases, the absorptance initially rises, followed by saturation, eventually decreasing rapidly. The absorptance of NW arrays with extremely small or large diameters has a narrow wavelength range capable of near-complete absorptance.

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