Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information for

Trapping and filtering light by single Si nanosphere in a GaAs nanocavity

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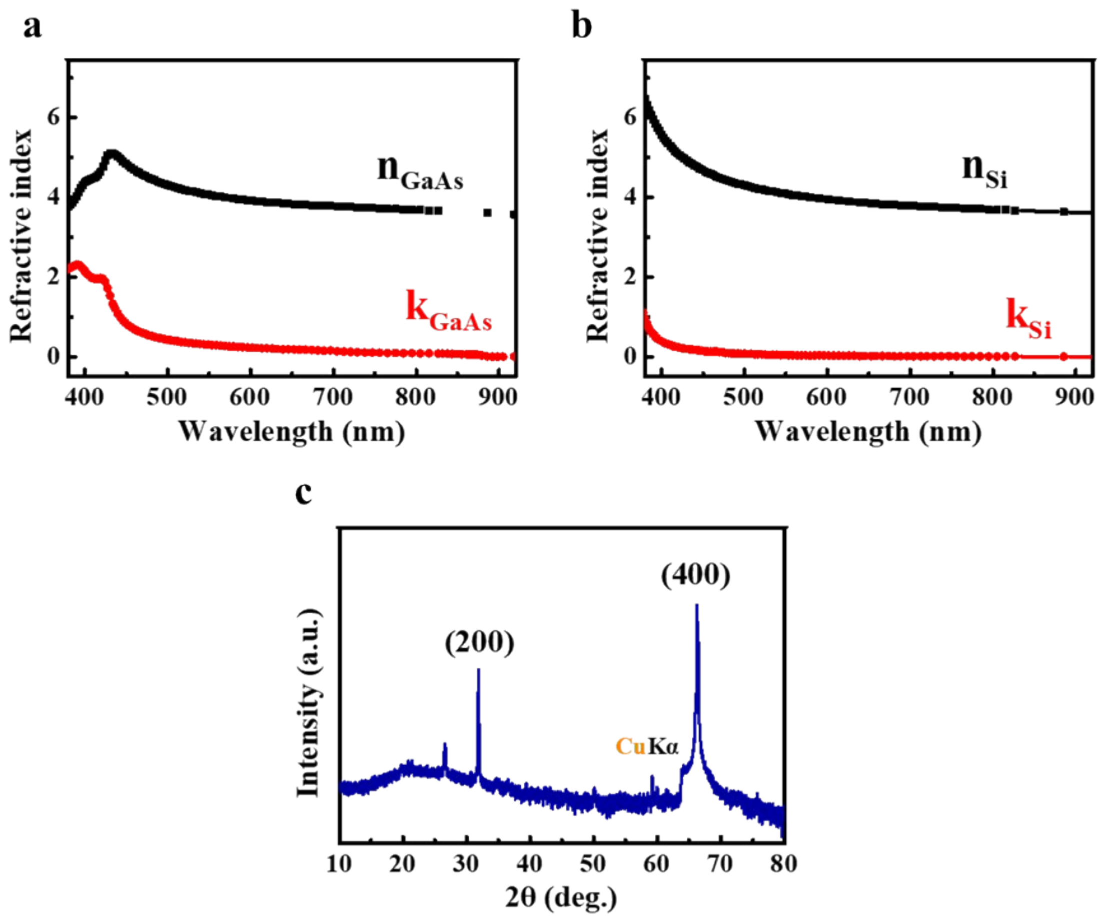

Figure S1. The refractive index of GaAs and Si and the XRD pattern of the monocrystalline GaAs substrate used in this work. The refractive index of (a) GaAs and (b) Si extracted from ref. 48. (c) XRD pattern of the monocrystalline GaAs substrate.

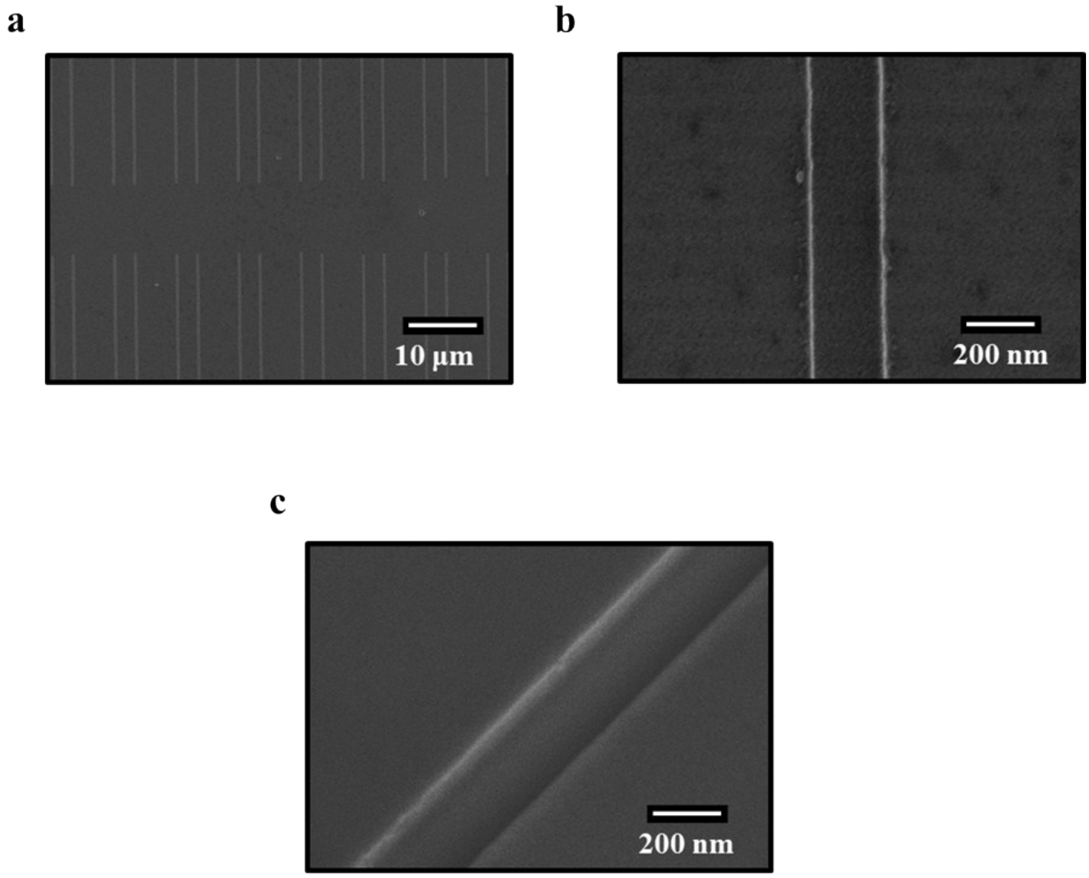

Figure S2. Morphology of the GaAs NGs. (a) The SEM images of a group of GaAs NGs. The SEM images of an individual GaAs NG with a higher resolution tilted by (b) 0 degree and (c) 45 degree. The scale bars are labeled on the graph.

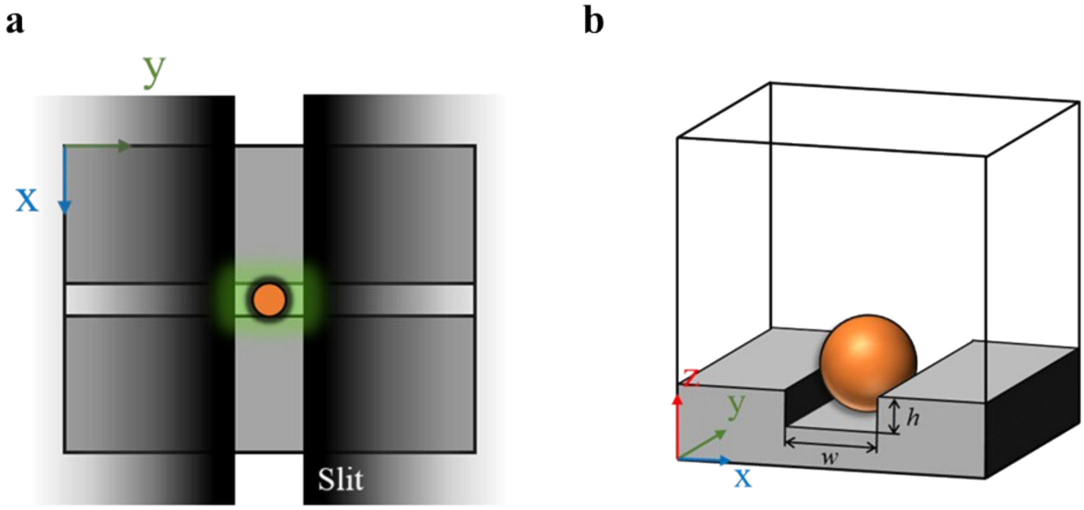

Figure S3. The illustration of the actual measured area and the corresponding modal in the simulations. (a) The actual measured area. We always measured the GaAs NGs with the same length which contain including the Si NSs or not since the width of the slit is obviously larger than the Si NSs. (b) The corresponding modal to simulate the actual situation in the experiment.

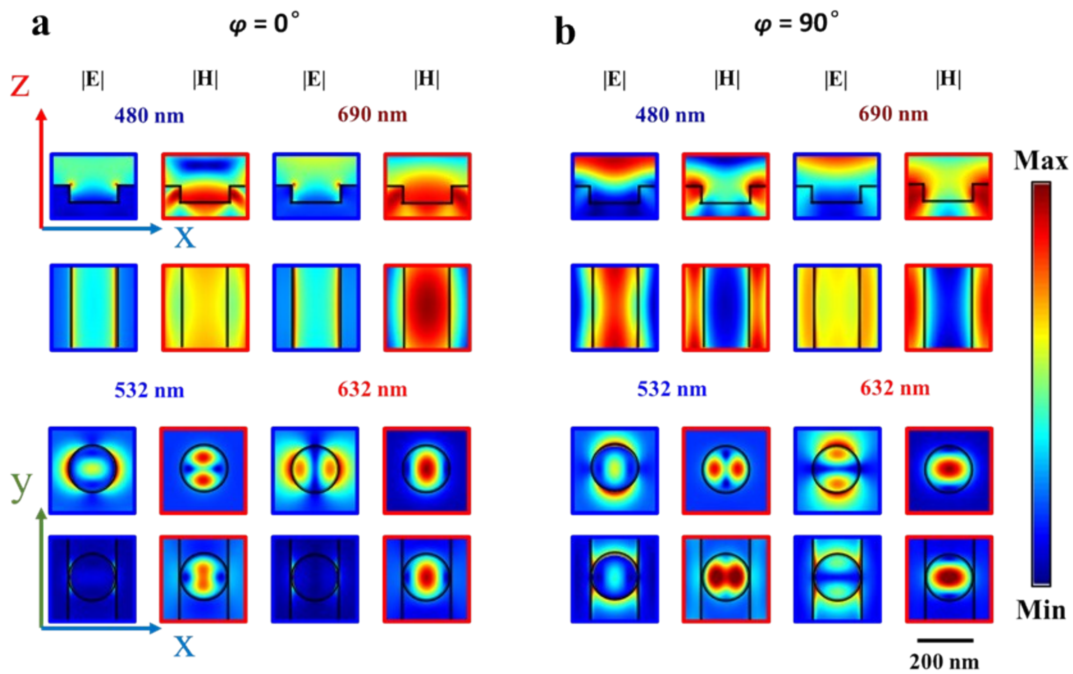

Figure S4. Electric and magnetic near-field distribution of different nanostructures. The electric and magnetic near-field distribution of isolated groove and nanosphere with their hybrid nanostructure at each resonance wavelength. These structures were illuminated with the linear polarized light illumination with an argument of (a) 0 degree and (b) 90 degree.

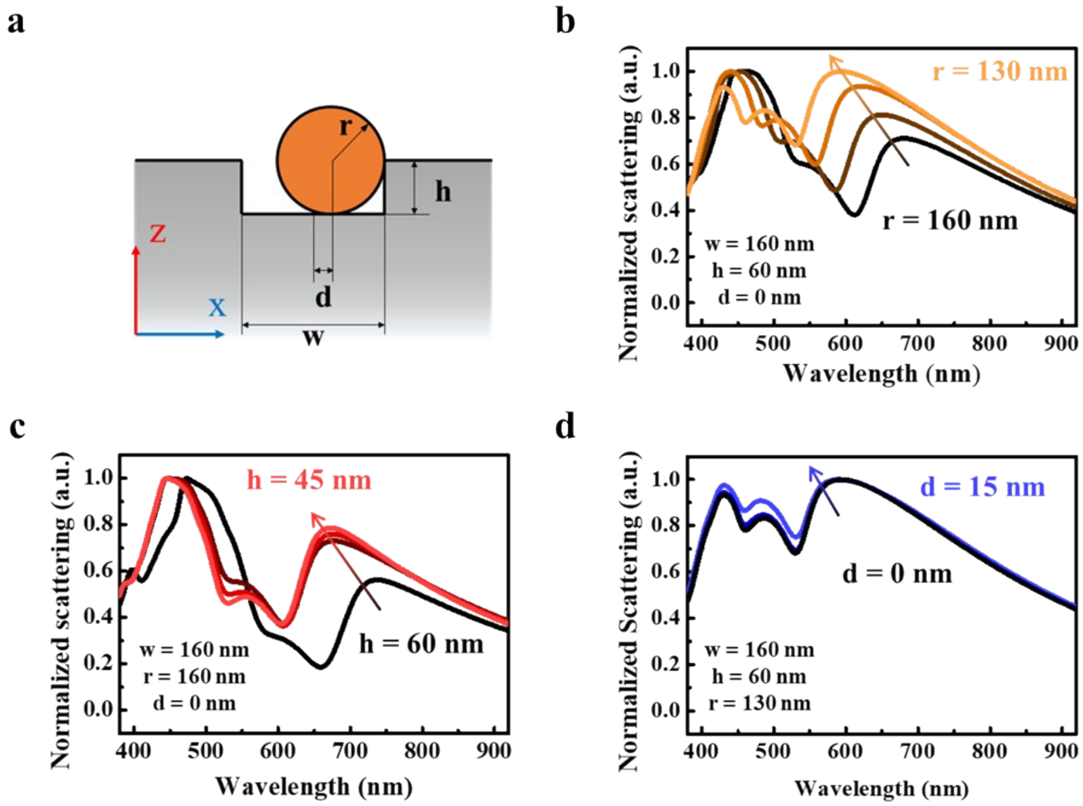

Figure S5. The influence of other size parameters on the coupling. (a) The parameters related to the coupling between GaAs NG and Si NS. The influence of (b) sphere diameter, (c) the groove depth, and (d) the distance between their centers on the backward scattering spectra.