

All-Dielectric Metasurfaces with High-Fluorescence-Enhancing Capability

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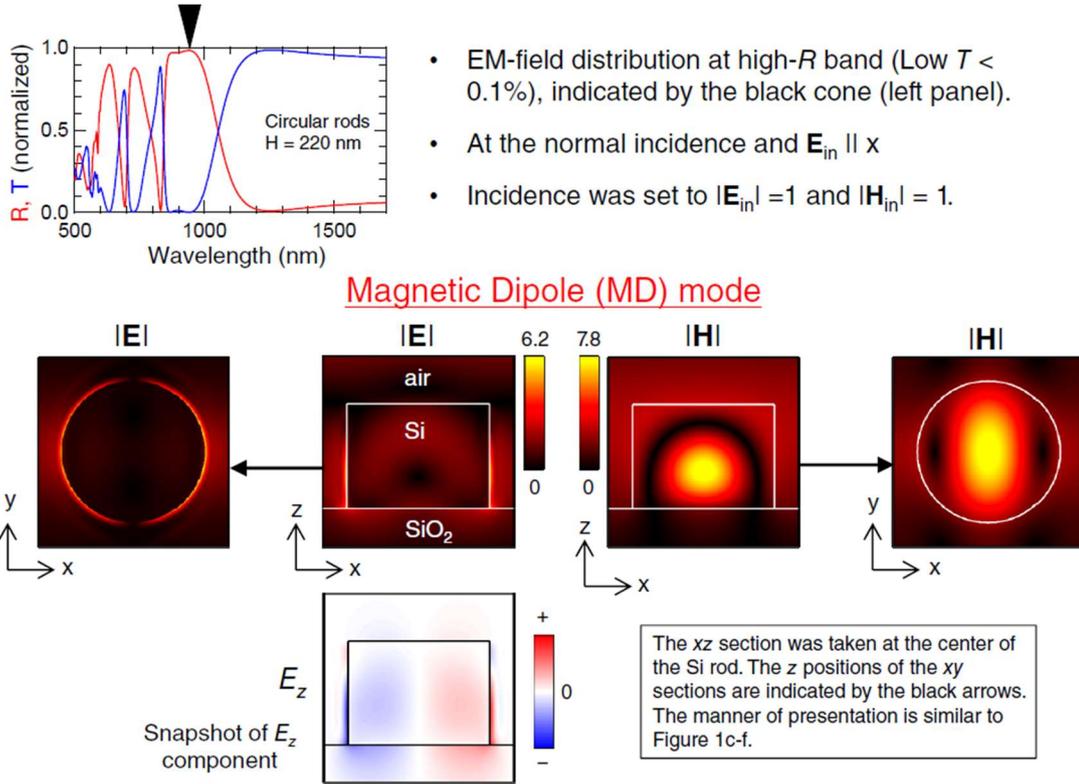


Figure S1. $P = 400$ nm, $D = 300$ nm, $H = 220$ nm.

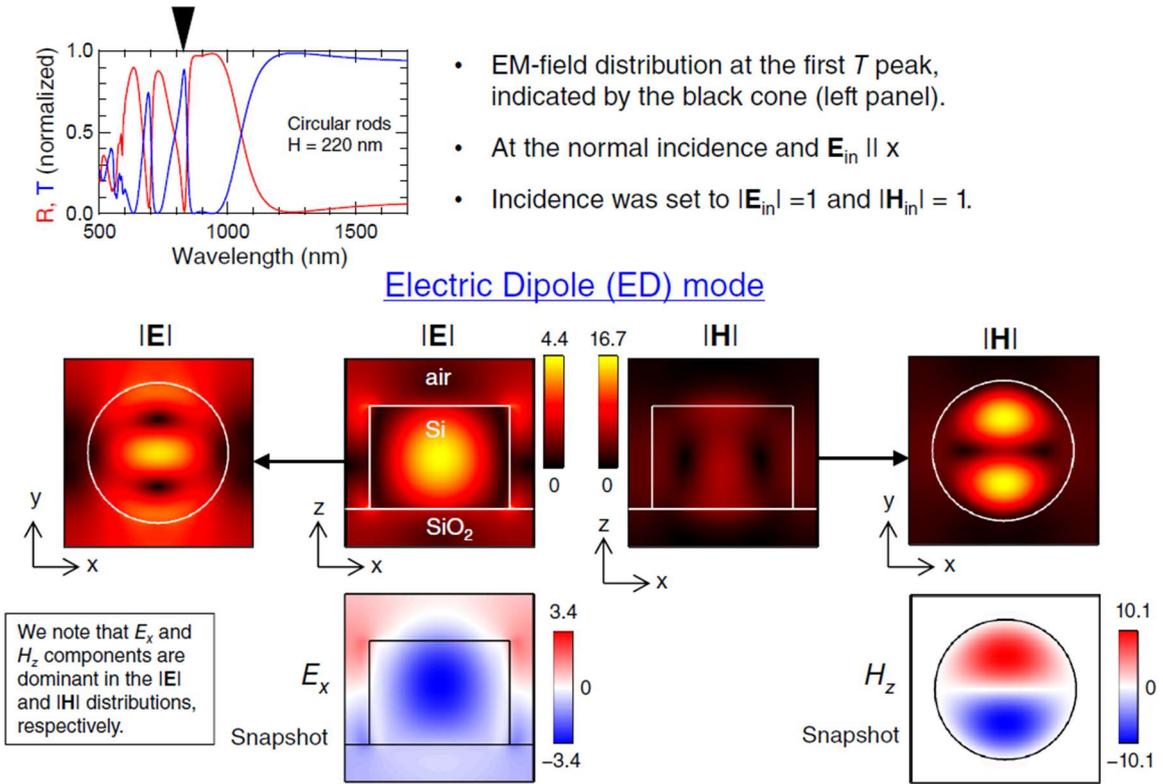


Figure S2. $P = 400$ nm, $D = 300$ nm, $H = 220$ nm.

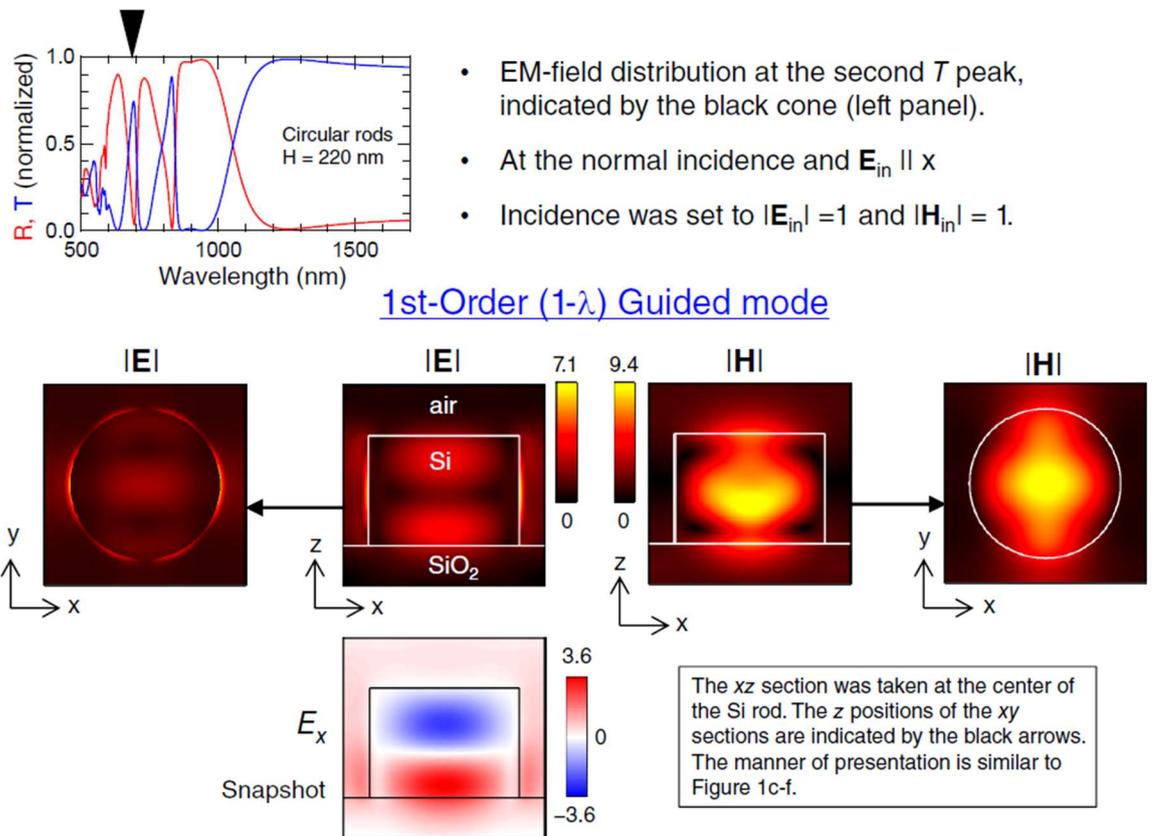


Figure S3. $P = 400$ nm, $D = 300$ nm, $H = 220$ nm.

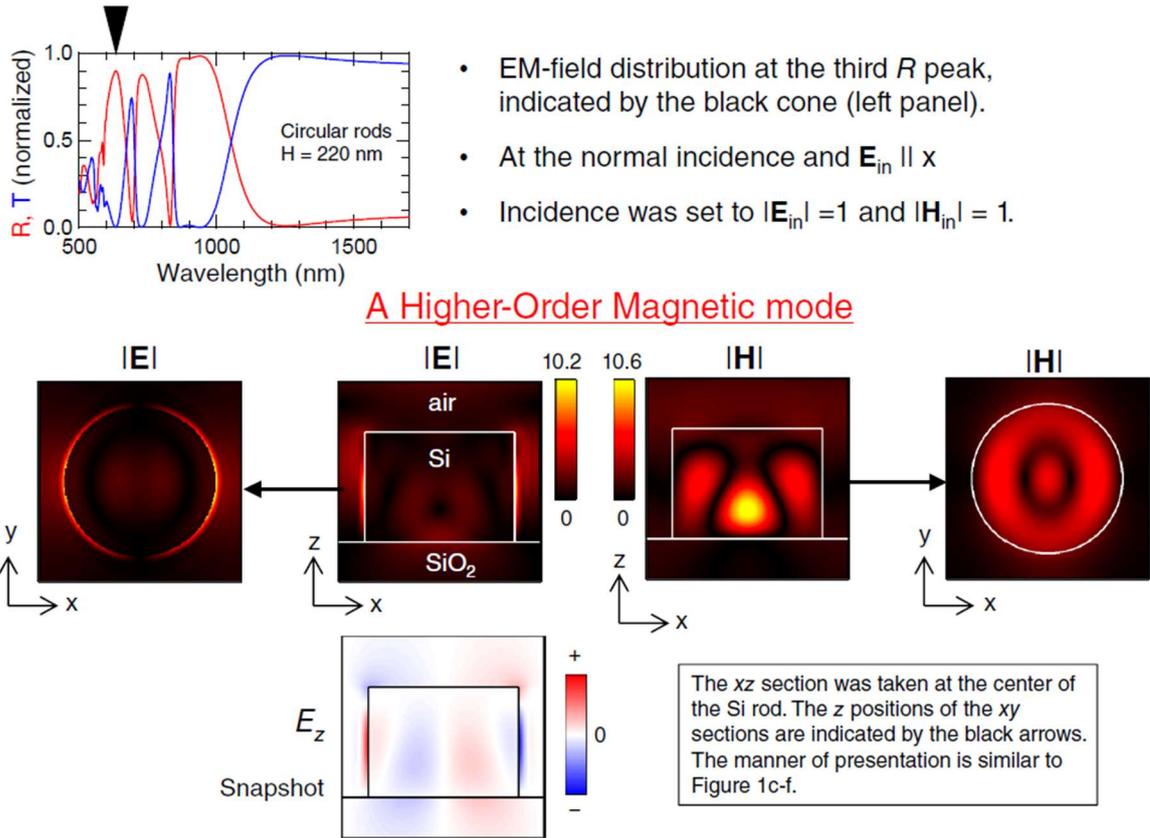


Figure S4. $P = 400$ nm, $D = 300$ nm, $H = 220$ nm

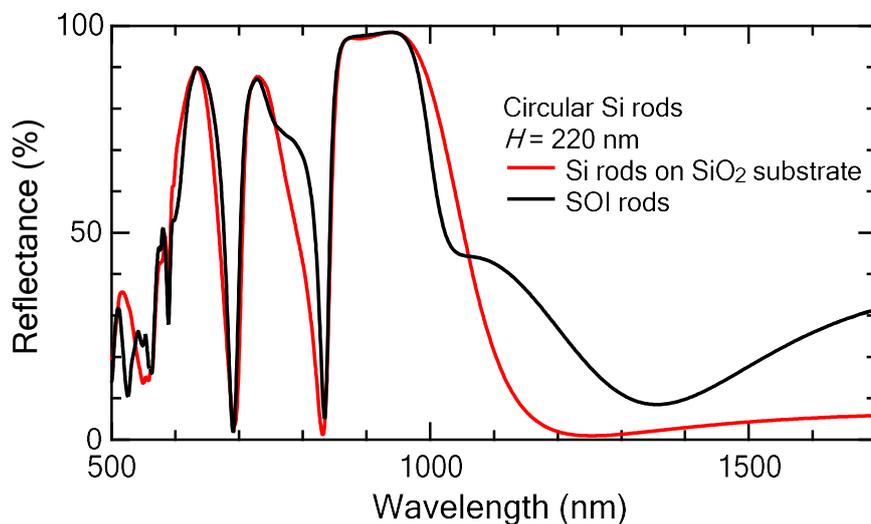


Figure S5. Comparison of R spectra.

Difference between the Si-rod-array metasurface on SiO₂ substrate (Figure 1) and a SOI-rod-array metasurface fabricated with a SOI substrate of (SOI 220 nm/ BOX 400 nm/ Si wafer) is studied in these simulated R spectra.

Red curve: R spectrum that is identical to that in Figure 1b.

Black curve: R spectrum of SOI-rod-array metasurface based on the SOI substrate. Only the SOI layer is assumed to be fabricated. The SOI thickness was set to be the same to the height of the Si rods on SiO₂ substrate. Also, the diameter of the SOI rods was set to be the same to that of the Si rods on SiO₂ substrate.

Incidence was set in the same way to Figure 1.

It is found that the three high-R peaks of $R > 80\%$ and the two R dips at about 690 and 830 nm exhibit good agreements, suggesting that the optical resonances are hardly affected by the substrates.

A difference coming from the substrates is seen at the interference effect in the range of 1050–1700 nm.

- $|E|$ distributions were numerically evaluated at the excitation wavelength of 532.0 nm.
- At the normal incidence and $\mathbf{E}_{in} \parallel x$
- Incidence was set to $|\mathbf{E}_{in}| = 1$.

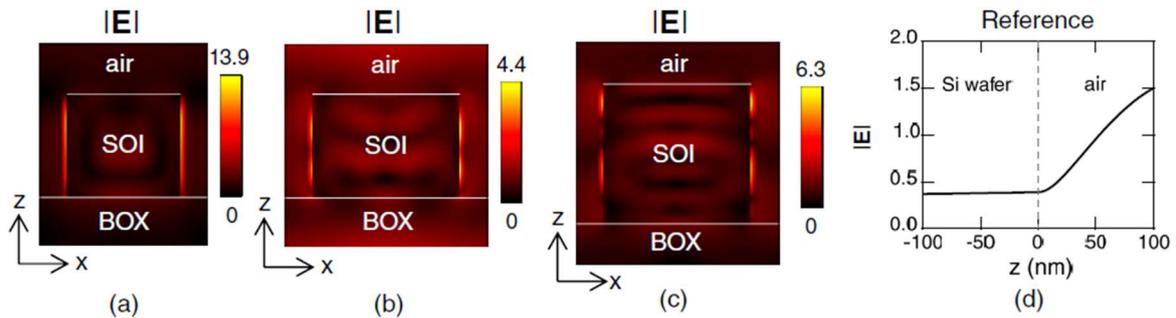


Figure S6. $|E|$ distributions at 532.0 nm. (a)-(c) $|E|$ distributions at xz sections. The xz sections in (a)-(c) were taken at the center of the Si rod. One period is shown along the x axes. SOI thickness was 200 nm and the periodic length $P = 330$ nm, corresponding to Figure 5. (b) SOI thickness was 200 nm and $P = 400$ nm, corresponding to Figure 6. (c) SOI thickness was 340 nm and $P = 400$ nm, corresponding to Figure 7. (d) The z profile of $|E|$ distributions in the reference configuration. Note that the incidence was set to propagate from the right to the left.