



Fig. 4. FDTD simulation results of the electric field distribution on the SRR metamaterial structures for (a) Hybrid 1 and (b) Hybrid 2 designs. The direction of the electric field vector of the THz wave is in the x direction.

4. Conclusions

In summary, planar uniform and hybrid SRR metamaterial were designed and successfully fabricated by femtosecond laser MLA lithography. The SRR meta-material structures were characterized by THz-TDS technique to measure their THz transmission spectra. It is found that interaction among the SRRs in metamaterial creates a strong mutual coupling within the region between 2 SRRs. The transmission spectra show a broad band resonance peaks. It is no longer a simple combination of distinctive individual resonance peak from each SRR size. It becomes broader as the SRRs are brought closer to each other. The coupling effect also introduces an additional peak at the lower frequency of THz regime at ~ 0.2 THz. The FDTD simulation of the hybrid SRR metamaterial structures at resonance frequencies confirms the strong coupling among the SRRs within the meta-materials. The hybrid SRR metamaterial designed and fabricated provide a novel approach to realize tunable and broad band THz response for the THz detection sensitivity enhancement.

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