

III.P.7. TiO₂ nanotubular structures for optoelectronic and photonic applications

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We prove analytically that metallized TiO_2 nanotubular structures are characterized by negative refractive index which opens the possibility for their use as cost-effective focusing elements. Flat and concave lenses assembled from these nanotubes demonstrate good focusing properties at specific photon energies which are determined by both the geometry of nanotubes and metal used. Along with this, formation of whispering gallery modes has been evidenced by the spectral distribution of cathodoluminescence related to individual TiO_2 nanotubes or a cluster of nanotubes. The obtained results show that the membranes consisting of weakly-bound TiO_2 nanotubes are promising materials for optoelectronic and photonic applications.