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标题: Terahertz refractive index sensors using dielectric pipe waveguides
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摘要: A dielectric pipe waveguide is successfully demonstrated as a terahertz refractive index sensor for powder and liquid-vapor sensing. Without additional engineered structures, a simple pipe waveguide can act as a terahertz resonator based on anti-resonant reflecting guidance, forming multiple resonant transmission-dips. Loading various powders in the ring-cladding or inserting different vapors into the hollow core of the pipe waveguide leads to a significant shift of resonant frequency, and the spectral shift is related to the refractive-index change. The proven detection limit of molecular density could be reduced to 1.6nano-mole/mm(3) and the highest sensitivity is demonstrated at around 22.2GHz/refractive-index-unit (RIU), which is comparable to the best THz molecular sensor [Appl. Phys. Lett. 95, 171113 (2009)]. (c) 2012 Optical Society of America
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