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标题: Metallic mesh-based terahertz biosensing of single- and double-stranded DNA
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摘要: We report on a promising approach for the label-free analysis of DNA molecules with electromagnetic surface waves in the terahertz (THz) region. A metallic mesh with a polyvinylidene difluoride membrane is employed for THz transmission analysis. The metallic mesh with opening holes provides a sharp dip structure in a THz transmission spectrum, which is sensitive to a small change of the refractive index of a sample on the metallic mesh surface. The optical properties of a small amount of DNA molecules cannot be investigated by a free-space THz measurement because of the low absorption coefficients of such samples. However, metallic mesh-based THz measurement revealed the difference in optical properties between single-and double-stranded DNA molecules on the basis of refractive index, as estimated from a dip frequency shift of the metallic mesh. Therefore, our metallic-based THz technique provides a dramatically enhanced sensitivity, and demonstrates the potential of our approach of the analysis of biologically relevant DNA samples. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4761966]
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