عنوان مقاله:
Numerical Modeling of a Nanostructure Gas Sensor Based on Plasmonic Effect

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خلاصه مقاله:
In the present paper, a nanostructure plasmonic gas sensor based on ringresonator structure at the wavelength range of ۰.۶-۰.۹ μm is presented. The plasmonicmaterials/SiO۲ with the advantage of high mobility and low loss is utilized as a substratefor structure to obtain some appropriate characteristics for the sensing Performanceparameters. To evaluate the proposed sensor and calculation of performance parametersincluding figure of merit and sensitivity, the effect of the different gas including CarbonDioxide (CO۲), Acetonitrile (C۲H۳N), Carbon disulfide, and Sarin are considered. Forthis purpose ۳D-FDTD method is considered. Our calculations show that by couplingbetween the incident waves and the surface plasmons of the structure, a hightransmission ratio of ۰.۸ and relatively low insertion loss of ۶ dB around the wavelengthinterval of ۰.۶-۰.۹ μm are achievable. Furthermore, the calculated sensitivity and figureof merit are ۲۸ and ۸.۷۵, respectively. This provides a path for development of nanoscalepractical on-chip applications such as plasmonic memory devices.

کلمات کلیدی:
Plasmonic, Gas sensor, Nanostructure