

激光应用

长径比对金纳米棒折射率传感灵敏度的影响

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摘要:

利用化学种子生长法制备了多种长径比的金纳米棒, 通过监测不同折射率下金纳米棒的局域表面等离子体共振(LSPR)波长移动来研究其折射率传感的灵敏度。实验结果表明, 随着纳米棒长径比增加, 其折射率传感的灵敏度近似线性地提高。在监测波长范围内, 灵敏度从长径比为2.5:1时的216nm/RIU增长至4.2:1时的352nm/RIU。对于长径比为4.2:1的金纳米棒, 用离散偶极子近似(DDA)的方法模拟了其折射率传感的灵敏度, 与实验结果基本一致。

关键词: 光谱学 局域表面等离子体共振 折射率传感 金纳米棒 长径比

Influence of aspect ratio on refractive index sensitivity of gold nanorod

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Abstract:

Gold nanorods with multiple aspect ratios were prepared using seeded growth method. The refractive index sensitivity of the nanorods was studied by monitoring the shift of localized surface plasmon resonance peak when the surrounding refractive index was changed. The experiment results show that sensitivity increases almost linearly with aspect ratio. It varies from 216nm/RIU (aspect ratio 2.5:1) to 352nm/RIU (aspect ratio 4.2:1) in the monitored wavelength range. Discrete dipole approximation (DDA) is performed to simulate the sensitivity of nanorod with aspect ratio 4.2:1, which is in accordance with the experiment results.

Keywords: spectroscopy localized surface plasmon resonance refractive index sensor gold nanorods aspect ratio

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