

## **Sensitivity of Plasmonic Nanoparticles**

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Although there are many existing methods of using plasmonics to detect chemical, biomolecules, and viruses, the major drawback is insufficient sensitivity. In search of highly sensitive materials, theoretical studies have suggested that the sensitivity ( $S$ ) of metal nanorods depends largely on aspect ratio ( $R$ ), but it is not experimentally proven. Moreover, the parameter that governs sensitivity of other shaped nanoparticles is still unveiled. In this talk, we will comprehensively survey the sensitivities of nanoparticles of various shapes, sizes, and compositions. By measuring sensitivities of  $>20$  types of nanoparticles and summarizing  $>25$  reported values in the literature, we find that nanoparticle sensitivity is mainly determined by aspect ratio and follows a linear relationship. Other parameters including metal compositions, shapes, bulk plasmon resonance frequency, and cross-sectional area have little effect on nanoparticle sensitivity. This work provides a foundation for integrating plasmonic nanoparticles with polymers in sensing applications.