

Abstract Submitted  
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**Sensitivity of plasmonic metal nanoparticles and their potential in plasmonic polymer nanocomposites** ASSAD KHAN, GUOLIANG LIU, Virginia Tech, VT TEAM — Currently the synthesis of plasmonic nanoparticles for sensing mostly focuses on the shape because it is believed that nanoparticles with sharp tips provide higher sensitivities than those without. Herein, by measuring and analyzing the sensitivities of more than 74 types of nanoparticles of various shapes, sizes, and compositions, we found that, contrary to this common belief, the correlation between shape and sensitivity is much weaker than that between aspect ratio and sensitivity. Among all the parameters investigated here including size, shape, composition, aspect ratio, cross-sectional area, and initial plasmonic resonance frequency, the aspect ratio is the key parameter that controls the nanoparticle sensitivity. Other parameters have much less influence on the nanoparticle sensitivity to refractive index changes. This finding can provide insight into the design of plasmonic nanomaterials for polymer sensing and polymer nanocomposites with advanced optical and plasmonic properties.

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