Thermo-optical effects of surface plasmons

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Abstract
Surface plasmon resonance sensors have been widely considered due to their sensitivity, accuracy and response speed. In order to stimulate surface plasmons, a crisman structure is used in which the metal layer (mainly gold or silver) is placed on the surface of the prism. Due to temperature changes, various factors such as optical properties of the metal, the prism and the surrounding environment can change, which can, in turn, change the response of the plasmonic sensors. In this paper, the thermal effects on the optical response of a surface plasmon resonance sensor were theoretically evaluated. The results showed that the change in temperature led to significant changes in the reflectivity and phase. The greatest effect was due to the changes in the optical properties of the metal layer (gold here) due to temperature changes.

Keywords: surface plasmon resonance, thermal-optical properties, crisman structure

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