

Our new paper in Applied physics A

Congratulations to our new paper "Detecting the thermoplasmonic effect using ellipsometry parameters for self-assembled gold nanoparticles within a polydimethylsiloxane matrix" by Maher Abdulfadhil Gatea, Hussein A. Jawad, S. M. Hamidi.

Light-to-heat conversion using active plasmonic materials is essential in wide-ranging applications, such as sensing, photonics, drug delivery, biomedical imaging, photothermal tumor therapy, and optoelectronics. In this work, we studied the thermoplasmonic effect and performed an optical analysis of different concentrations of self-assembled gold nanoparticles in transparent dielectric polydimethylsiloxane polymer medium under continuous-wave radiations. Composite samples were prepared and investigated experimentally by ellipsometry method and thermal photography. The gold-nanoparticle content of each composite film directly increased the generated temperature. The structure and optical properties of the samples under ambient conditions were obtained efficiently depending on the ellipsometry parameters for each polarized light. Results showed that the prolongation of the incubation time led to a lower phase value for p polarization than that for s polarization. This finding was due to the change in ellipsometry parameters and, thus, the thermoplasmonic effect. This new method of investigating the thermoplasmonic effect can provide new insights into the medical applications of plasmonic media.

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