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Third-order nonlinear optical properties of colloidal gold nanorods

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Streszczenie

We have evaluated the third-order nonlinear optical properties of gold nanorods in water solution in a broad range of wavelengths including both the longitudinal and transverse surface plasmon resonance (SPR) bands. On the basis of the analysis of Z-scan measurements performed with femtosecond laser pulses, we conclude that the optical nonlinearity in the longitudinal-SPR absorption range originates mainly from the saturation of the one-photon absorption, whereas a resonant two-photon absorption process is dominant in the transverse-SPR range of wavelengths. The discrepancies in the values of two-photon absorption coefficients reported by various researchers and the methods of reliable comparison of the results are discussed.

Słowa kluczowe

Saturation, Absorption, Nonlinear optics, Optical properties, Quantum mechanics

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