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Investigating the nonlinear behavior of cobalt (II) phthalocyanine using visible CW laser beam

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Abstract

Experimental and theoretical results of the diffraction ring patterns in cobalt (II) phthalocyanine (PcCo(II)) in dimethyl formamide solution using visible low power continuous wave CW laser beam are reported. The wave-front curvature of the used laser beam seem to modify the spatial phase modulation of the beam. The upward convection modify each pattern by reducing the vertical diameter of each ring in comparison with horizontal one. At low input power the effect of convection is minimized. Simulation results given are based on the Fresnel-Kirchhoff diffraction integral. The nonlinear refractive index of the solution of PcCo(II) was measured using Z-scan technique, by exciting with CW laser at 473 nm wavelength. The effect of concentration of the sample on nonlinear refractive index has been investigated.

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Keywords

Phthalocyanine; Self-phase modulation; Thermal nonlinearity; Diffraction ring pattern; Z-scan technique

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