Synthetic Metals
Volume 257, November 2019, 116158

Synthesis, characterization, and study of the nonlinear optical properties of two new organic compounds

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https://doi.org/10.1016/j.synthmet.2019.116158

Highlights

- The nonlinear optical properties of OpTpPzNi(II) and PcAlCl are investigated.
- The nonlinear refractive index is determined by Z-scan method.
- The OpTpPzNi (II) solution exhibits self-diffraction ring patterns.

Abstract

Two new compounds, viz., Octaphenyl Tetrapyrazino Porphrazine Nickel (OpTpPzNi (II)) and Phthalocyaninato Aluminum Chloride (PcAlCl) with two different central metal atoms nickel and aluminum are prepared and identified respectively. Self-diffraction ring patterns were observed, as the solution of OpTpPzNi(11) in the solvent dimethyformamide was illuminated with continuous wave low power laser beams of 473 nm and 532 nm, respectively. It was found that the diffraction ring patterns depend critically on wavelengths and intensities of laser beams. Simulation results of the experimental diffraction ring patterns using Fresnel-Kirchhoff integral are obtained. The theoretical findings are in good accord with the experimental ones. The nonlinear refractive index, n_2, of OpTpPzNi(II) solution is determined by diffraction ring patterns and the Z-scan techniques, while the nonlinear refractive index, n_2, of PcAlCl solution is estimated by Z-scan technique only.

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42.70.-a; 42.65-k; 42.65.An

Keywords

OpTpPzNi(II) and PcAlCl; Spatial self-phase modulation; Diffraction ring patterns; Z-scan; Nonlinear refractive index

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