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EVOLUTION OF FAR-FIELD DIFFRACTION PATTERNS AND NONLINEAR OPTICAL PROPERTIES OF SAE 70 OIL

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ABSTRACT

The investigation of nonlinear optical characteristics of SAE 70 oil, by using self - diffraction techniques and Z-scan technique, using continuous wave (CW), visible laser beam is presented. Multiple diffraction rings were observed, when a beam propagates through this oil. A large thermal-induced nonlinear refractive index, up to 2.498×10^{-7} cm^2/W was obtained from SAE 70 oil, under 473 nm continuous wave (CW), laser irradiation. The nonlinear absorption of SAE 70 oil was obtained from open aperture, z-scan technique. Optical limiting performance of SAE 70 oil was investigated under irradiation, by a CW laser beam using transmission measurement, through the sample which indicates that this material is a potential candidate, for optical limiting applications in low power CW regime.

KEYWORDS: Nonlinear Optics, Nonlinear Refractive Index, Z-Scan Technique, Optical Limiting

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