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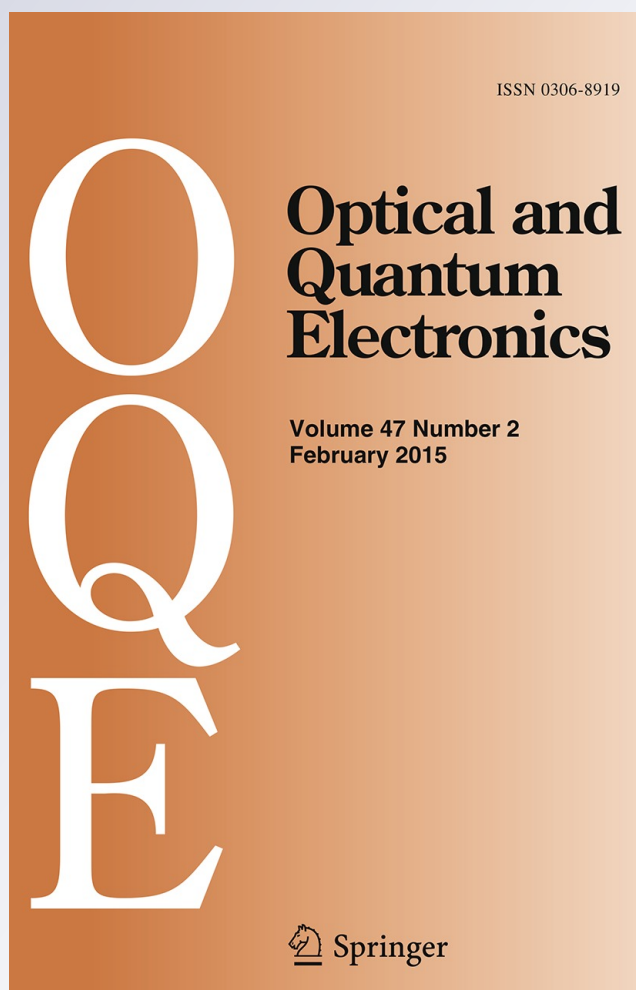
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Abstract The optical limiting performance of sudan red B is described in solution and in the solid state. The measurements were performed using a cw solid state laser. Parameters of optical limiting properties such as the threshold and saturated values can be engineered by modifying the parameters of the set-up and the concentration of the sample. It has been found that the limiting efficiency for sudan red B doped polymerthyl methacrylate (PMMA) is better than in sudan red B in the solvent toluene sample. The sudan red B doped PMMA exhibits good optical limiting features at 532 nm with the limiting threshold of 5.8 mW. The present studies suggest that polymer film is a potential candidate for optical device applications such as optical limiters.

Keywords Optical limiting · Dye · Polymer · Limiting threshold

1 Introduction

With the rapid development of new laser technology, the optical limiting materials for the protection of optically sensitive devices and human eyes from laser damage in both civilian and military applications have received significant attention in recent years (Tutt and Kost 1992; Spangler 1999; Tutt and Boggess 1993; Yin et al. 2005a, b; Zhang et al. 2001; Vestberg et al. 2006). An optical limiter strongly attenuates the laser beam of high intensity whereas it is completely transparent at lower light intensities. Ideally, the laser beam transmitted through the limiter rises linearly with input power and saturates to a constant value at high power at which the transmittance is fifty percent. Above the threshold, the output power is clamped to the saturated value which depends on the material.

Previous research on optical limiting materials has focused on the optical nonlinear organic materials Zidan et al. (2010), organic dyes Sun and Riggs (1999) and conjugated polymers

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