

# THIRD-ORDER NONLINEAR OPTICAL RESPONSE AND OPTICAL LIMITING BEHAVIOR OF 3,4-DIAMINOPYRIDINE

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## Abstract

In This paper is reported the experimental investigation on third-order nonlinear optical parameters of a 3,4-Diaminopyridine in solvent DMSO by using Z-scan technique. The measurements were performed using cw from a solid state laser at 473 and 532 nm wavelengths. The results reveal that 3,4-Diaminopyridine exhibits large negative nonlinear refractive index,  $n_2$ , of the order of  $10^{-7} \text{ cm}^2/\text{W}$ . The nonlinear optical properties were found to vary with concentration and wavelength. Also it was found that the 3,4-Diaminopyridine in solvent DMSO exhibits good optical power limiting. This 3,4-Diaminopyridine has potential application as photonic and optoelectronic devices.

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**Keywords:** Nonlinear refractive index, Z-scan, optical limiting.

## Introduction

With the development of optical communication networks, various nonlinear optical (NLO) devices such as optical switches, optical limiters, optical detectors and optical sensors have attracted considerable attention because of their widespread usage for scientific and industrial purposes (Moloney et al. 1989 ; Pittman et al. 1989 ; Tutt et al. 1992 ; Tutt et al. 1993 ; Tang et al. 1999 ; Tang et al. 2000; Chen et al. 2002; McEwan et al. 2003; Lam et al. 2005 ; Li et al. 2006),. Among all the NLO behaviors, optical limiting is one of the most promising for practical applications, as it can protect the human eye and photosensitive components from the damage caused by intense optical radiation (Crane et al. 1995). Optical limiting results from irradiance- dependent NLO responses of materials in which the incoming intense light alters the refractive and absorptive properties, resulting in a greatly reduced transmitted intensity. It is important to select