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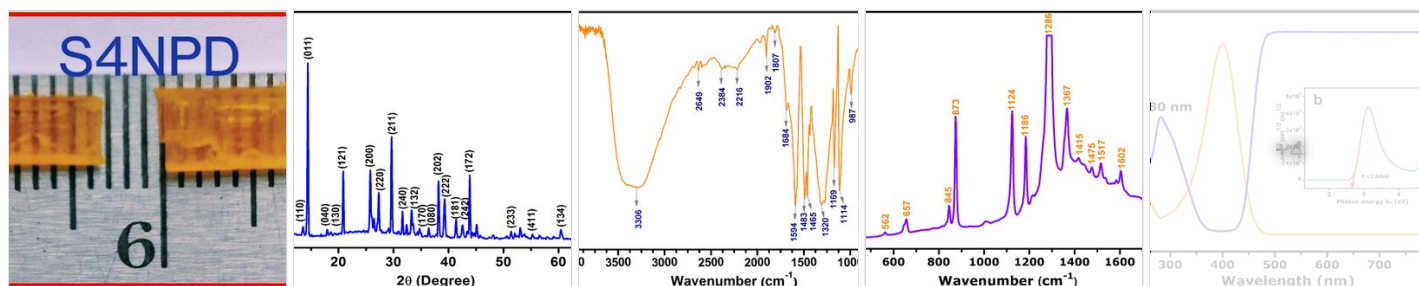
# Enhancing the optical properties of sodium 4-nitrophenolate dehydrate single crystals: role of second and third harmonic generation efficiencies

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DOI: [10.1007/s10854-023-10876-y](https://doi.org/10.1007/s10854-023-10876-y)K. Vijayakumar · P. Palani · M. Thiyagarajan · [Show all 8 authors](#) · P. PurushothamanCitations 2Reads 109[View access options](#)[Export citation](#)
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Abstract and figures

A slow evaporation method has grown the sodium 4-nitrophenolate dehydrate (S4NPD) crystals. FTIR and Raman spectra have analyzed the chemical structure of synthesized S4NPD. The single crystal XRD and Powder XRD studies confirmed S4NPD crystal contains the orthorhombic crystal system. The UV-Vis absorption and transmittance analysis reveal that the grown crystal possesses an optical transmittance in the visible and NIR regions. The cut-off wavelength of the S4NPD is 435 nm, and these features are more appropriate for emerging optical fields. The photoluminescence spectrum shows the peak absorbed at 517 nm, indicating green light emission. The nonlinear optical properties with the enhancing role of the growth crystal's second and third-harmonic generation efficiencies. The laser threshold damage (LDT) value shows the suitability of crystal coupled with high-power laser output applications. A chemical etching study was carried out to examine the growth pattern of the S4NPD crystal.



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# Enhancing the optical properties of sodium 4-nitrophenolate dehydrate single crystals: role of second and third harmonic generation efficiencies

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## ABSTRACT

A slow evaporation method has grown the sodium 4-nitrophenolate dehydrate (S4NPD) crystals. FTIR and Raman spectra have analyzed the chemical structure of synthesized S4NPD. The single crystal XRD and Powder XRD studies confirmed S4NPD crystal contains the orthorhombic crystal system. The UV–Vis absorption and transmittance analysis reveal that the grown crystal possesses an optical transmittance in the visible and NIR regions. The cut-off wavelength of the S4NPD is 435 nm, and these features are more appropriate for emerging optical fields. The photoluminescence spectrum shows the peak absorbed at 517 nm, indicating green light emission. The nonlinear optical properties with the enhancing role of the growth crystal's second and third-harmonic generation efficiencies. The laser threshold damage (LTD) value shows the suitability of crystal coupled with high-power laser output applications. A chemical etching study was carried out to examine the growth pattern of the S4NPD crystal.

## 1 Introduction

Many researchers in recent years have focused on different types of single crystals for the suitability of multifunctional device fabrication for nonlinear

optical applications. Due to affordability, organic crystals are widely used in various industrial applications [1, 2]. Since organic molecules have the unique nature of a delocalized electron mechanism which enhances NLO properties, compounds can be

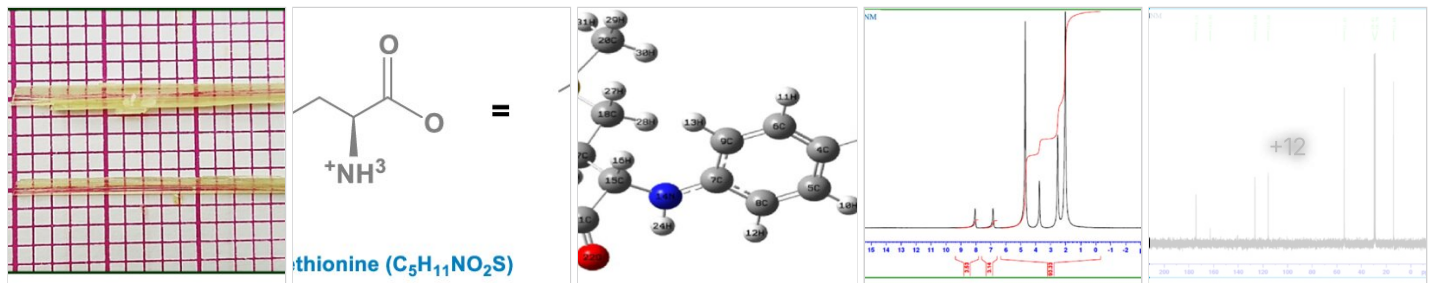
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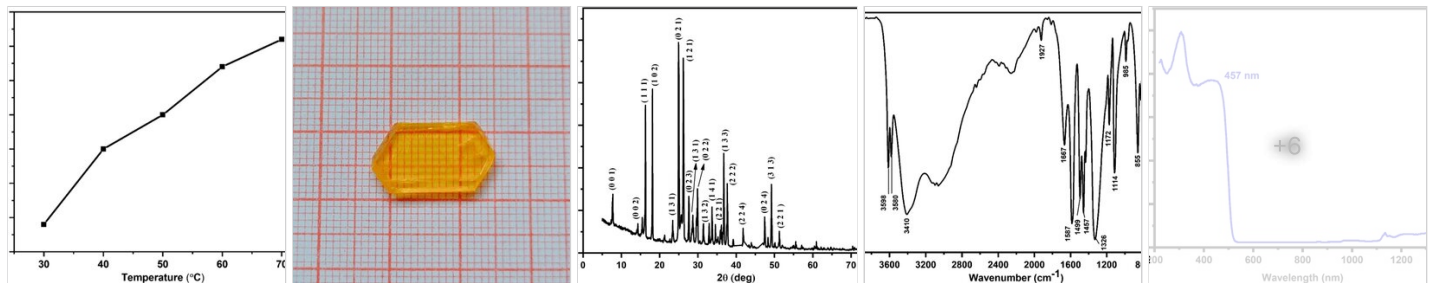
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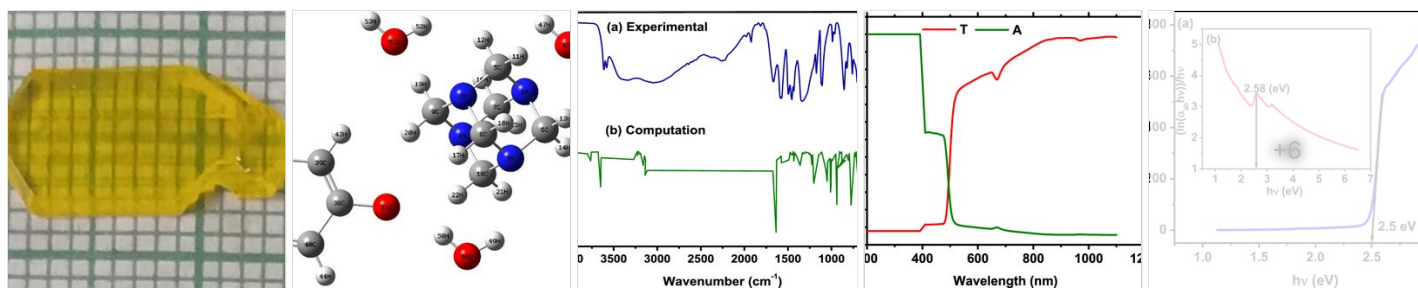
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