

$^4F_{3/2} \rightarrow ^4I_{11/2}$  in  $Nd^{3+}$  doped SBN ceramic systems could be a potential candidate for various photonic applications.

Chapter 6 discusses the nonlinear absorption behavior of pure SBN and rare earth ( $Eu^{3+}$  and  $Nd^{3+}$ ) doped SBN nano ceramic systems which has been investigated employing the open aperture Z-scan technique using 532 nm, 5 ns laser pulses. The effective three-photon anano ceramic systems. The three-photon absorption coefficients of pure SBN, SBN:Eu and SBN:Nd bulk ceramic systems were also calculated as  $1.2 \times 10^{-23} \text{ m}^3/\text{W}^2$ ,  $5.8 \times 10^{-23} \text{ m}^3/\text{W}^2$  and  $9.1 \times 10^{-23} \text{ m}^3/\text{W}^2$  respectively. It is found that these materials are potential optical limiters at this excitation wavelength.

Chapter 7 describes the conclusion and future scope of works. This chapter sums up the salient features of the work described in this thesis and the scope for potential investigations in this field.

The research work presented in the thesis has either been published or communicated to reputed peer reviewed international journals, conference proceedings and presented in various national/international seminars

#### Papers published in International Journals

1. *Nonlinear Optical Properties of Nanosized Rare Earth Doped Strontium Barium Niobate Ceramics*, J. Nuja, Suchand Sandeep C.S, Reji Philip and Nandakumar K., Spectroscopy Letters 44 (2011) 334-339.
2. *Structural and Photoluminescence Studies on Nanosized Samarium- Doped Strontium Barium Niobate Ceramics*, J. Nuja and N. Kalarikkal, Spectroscopy Letters 45 (2012) 184-189.
3. *Structural and Luminescent Studies on Samarium doped Srontium Barium Niobate*, Nuja J. and Nandakumar K. (Communicated to Journal of Luminescence-2011).
4. *Red Luminescence of  $Eu^{3+}$  ions in SBN ceramic system*, Nuja J. and Nandakumar K. (Communicated to Journal of Rare Earths-2011).
5. *Fluorescence and Radiative Properties of  $Nd^{3+}$  Doped in SBN Ceramic System*, Nuja J. and Nandakumar K. (Communicated to Journal of Fluorescence-2012).

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- 1 *Nano and bulk Nd<sup>3+</sup> doped SBN ceramic systems as phosphors*, Nuja J. and Nandakumar K., 2<sup>nd</sup> International Conference on Nanomaterials (ICN-2012) January 12-15, 2012 held at Mahatma Gandhi University, Kottayam, Kerala, India.
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- 3 *Optical Study on Nanosized Sr<sub>0.5</sub>Ba<sub>0.5</sub>Nb<sub>2</sub>O<sub>6</sub> Ceramics*,  
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6. *Luminescence Study on Nanosized Sr<sub>0.5</sub>Ba<sub>0.5</sub>Nb<sub>2</sub>O<sub>6</sub>:Sm<sup>3+</sup> Ceramics*,  
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7. *Luminescent and structural studies on Sm<sup>3+</sup> modified SBN*,  
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8. *Photoluminescence of Sm<sup>3+</sup> doped SBN ceramics*,  
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