




भारत सरकार / Government of India
परमाणु ऊर्जा विभाग / Department of Atomic Energy
होमी भाभा राष्ट्रीय संस्थान / Homi Bhabha National Institute
राजा रामन्ना प्रगत प्रौद्योगिकी केन्द्र
Raja Ramanna Centre for Advanced Technology



HBNI Faculty Profile

Name	<i>Dr Indranil Bhaumik</i>	
Designation	<i>Professor</i>	
Research Area	<i>Growth of single crystal; Structure-property correlation; Phase transition; Investigation of Ferroic & electronic phenomena and Optical & spectroscopic property; Defect chemistry and characterization.</i>	
Research Profile	<i>Our research focuses on the understanding the correlation between crystal structure and ferroic as well as optical properties of material, mainly in the single crystal form. The research area spans over linear & non-linear optics, laser materials, piezoelectrics, ferroelectrics, wide band-gap semiconductors and scintillators. Single crystals are grown in the lab by several sophisticated techniques such as Czochralski method, optical floating zone, Bridgmann technique and solution growth technique. Several specialized crystal growth equipment are designed and developed in-house. We also aim to tailor the properties of materials by doping the host crystal for non-linear optical, laser, piezo- and ferro-electric applications.</i>	
Ten Selected Recent Publications		
1.	K.S. Samantaray, R. Amin, P. Maneesha, Indranil Bhaumik, S. Sen, "Effect of electrical poling on the structural, vibrational, and electrical properties of $0.94(\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3)-(0.06-x)\text{CaTiO}_3-x(\text{BaTiO}_3)$ lead-free ceramics", Ceramic International, 49 (2023) 14310.	
2.	A. Sharma, P. Yadav, R. Bhatt, S. Banik, G. Singh, Indranil Bhaumik, "Effect of Nb Substitution on the Electronic Property of Lead-free piezoelectric $(\text{Na}_{0.41}\text{K}_{0.09}\text{Bi}_{0.50})\text{TiO}_3$, Single Crystal: Optical Absorption and Photoelectron Study", J. Applied Physics 132 (2022) 205103.	
3.	P. Yadav, A. Sharma, Indranil Bhaumik, G. Singh, "Effect of electric field induced structural ordering on photo-luminescence and piezoelectric response of praseodymium doped $(\text{Na}_{0.41}\text{K}_{0.09}\text{Bi}_{0.5})\text{TiO}_3$ ceramics" , J. Applied Physics 132	



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	(2022) 224104.
4.	A. Sharma, P. Yadav, R. Bhatt, M. Soharab, G. Singh, Indranil Bhaumik, "Refractive index and domain structure of undoped and Nb doped (Na _{0.41} K _{0.09} Bi _{0.50})TiO ₃ (NBT-KBT) single crystal grown at MPB composition", Optical Materials 133 (2022) 113021.
5.	P. Yadav, A. Sharma, H. Srivastava, Indranil Bhaumik, G. Singh, V.S. Tiwari, "A correlation of piezoelectricity and photoluminescence of europium doped (Na _{0.41} K _{0.09} Bi _{0.5})TiO ₃ with ferroelectric and structural ordering," , Ceramics International 48 (2022) 3243.
6.	M. Soharab, R. Bhatt, A. Saxena and Indranil Bhaumik, Effect of Cr co-doping on the optical absorption and emission characteristics of Yb:YVO ₄ single crystals grown by OFZ technique, Optical Materials 128 (2022) 112434.
7.	R. Amin, K. Samantaray, S. Ayaz, S.N. Sarangi, Indranil Bhaumik, S. Sen, "Room temperature multiferroicity with enhanced ferroelectric and ferromagnetic properties in Ba _{0.75} Pb _{0.25} Ti _{1-x} Fe _x O ₃ ," , J. Alloys and Compounds, 897 (2022) 162734.
8.	K.S. Samantaray, R. Amin, E.G. Rini, Indranil Bhaumik, A. Mekki, K. Harrabi, S. Sen, "Defect Dipole Induced Improved Electrocaloric Effect in Modified NBT-6BT Lead-Free Ceramics", J. Alloys and Compounds, 903 (2022) 163837.
9.	Indranil Bhaumik, V.L. Ananthu Vijayan, R. Bhatt, M. Soharab, S. Ganesamoorthy, A.K. Karnal, "Crystal Interface Control at Low Thermal Gradient and Investigation of the Effect of Cr on the Crystal Structure and Optical Properties of Bismuth Silicate", Phys. Status Solidi B, 258 (2021) 2100315. , (This invited article also appears in: 60 years of pss)
10.	M. Soharab, Indranil Bhaumik, R. Bhatt, A. Saxena, A.K. Karnal, "Unusual absorption and emission characteristics of Cr co-doped Nd:GdVO ₄ laser gain crystal", J. Alloys and Compounds 886 (2021) 161182.