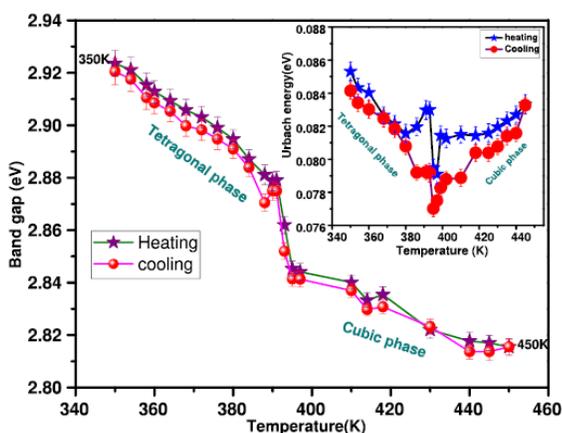


Relaxation in Pure BaTiO₃

Group Leaders: Dr. P.R. Sagdeo and Dr. Rajesh Kumar
Research Scholars: Vikash Mishra *et. al.*

The search for the new material(s) for various electronic applications have dominated the research worldwide particularly after the development of silicon based tiny integrated circuits and BaTiO₃ based tiny capacitors. During last five decades the nature of electronic devices has witnessed huge changes. Very small as well as energy efficient electronic devices are replacing the conventional electronic circuit elements. While using a material for a specific purpose it is important know the exact values of Band Gap and corresponding disorder present in the sample. Possibly for the first time using simple temperature and time dependent optical spectroscopy our group has shown that pure BaTiO₃ shows relaxation of electronic disorder of the order of 0.08eV. This is one of the very crucial information as pure BaTiO₃ is considered to be non relaxor material and know to show relaxation only at THz range.

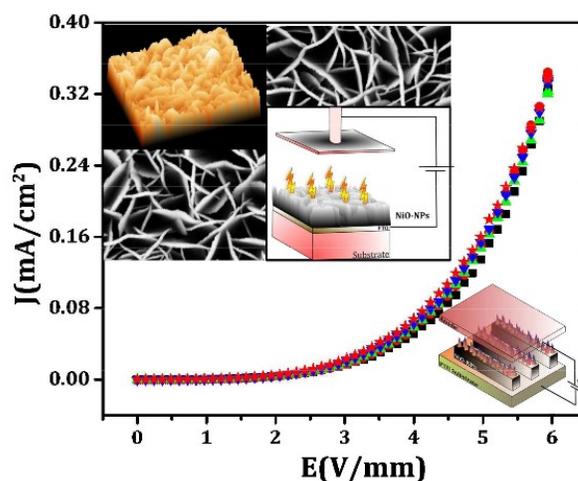


Variation in band gap during heating and cooling cycles which confirms reversibility in the band gap values of BaTiO₃, however, Eu shows hysteresis as shown in the inset. The vertical lines are error bars in the measurements, which show that the errors are very small when compared to the variation in the Eu values near the transition temperature (see the inset). [Journal of Applied Physics 122, 065105 \(2017\); doi: 10.1063/1.4997939](https://doi.org/10.1063/1.4997939)

NiO Excellent Electron Emitter

Group Leaders: Dr. Rajesh Kumar and Dr. P.R. Sagdeo
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The enhance electron emission is the need for bright electron source in new generation of scanning and tunneling electron microscopy. Recently our group has shown that NiO nano flakes are potential candidates as a bright electron emitter. A power efficient and stable field emission from ultrathin nanothorn covered nickel oxide (NiO) nanopetals (NPs) fabricated using a simple technique. Which is very extensively applicable in field emission (FE) based display device.



Schematic illustration of parallel plate field emission measurement set-up. Field emission (J-E plot) obtained from NiO-NPs@FTO at various cycles. Insets show J-E curves. <http://dx.doi.org/10.1039/C7TC01949A>