

1 Tailoring Bulk Photovoltaic Effects in Magnetic Sliding Ferroelectric Materials Chunmei Zhang¹, Ping Guo¹, Jian Zhou^{2,*} ¹School of Physics, Northwest University, Xi'an 710069, China ²Center for Alloy Innovation and Design, State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, China

Here a non-toxic co-doped $\text{Ba}_{1-x}(\text{Bi}_{0.5}\text{Li}_{0.5})_x \text{TiO}_3$ ferroelectric system is designed where the dopants influence the band topology in order to enhance the photovoltaic effect.

Here, the authors find bulk photovoltaic effect in 2D ferroelectric CuInP_2S_6 . Introduction. The bulk photovoltaic effect (BPVE), a kind of nonlinear optical process that converts light into ...

The intercorrelated programming of ferroelectric order along out-of-plane (OOP) and in-plane (IP) directions enables a tunable bulk photovoltaic (BPV) effect through multidirectional electrical control.

photovoltaic response in the visible light spectrum owing to its narrow bandgap. It was demonstrated that the generated photovoltaic current density was nearly two orders of magnitude greater than conventional bulk ferroelectric materials. These findings highlight the potential of two-dimensional ferroelectric semic

Here, the authors find bulk photovoltaic effect in 2D ferroelectric CuInP_2S_6 . View. Show abstract. Flexoelectronics of centrosymmetric semiconductors. Article. Full-text available. Aug 2020;

Short-circuit photocurrent due to bulk photovoltaic effect displays an oscillatory dependence on the polarization state of light. Here, we explore how the ferroelectric polarization direction in h-LuMnO_3 crystals affects the oscillating short-circuit photocurrent. It is shown that after prepoling the crystal at saturation, at remanence, the direction and amplitude of ...

Phonon Influence on Bulk Photovoltaic Effect in the Ferroelectric Semiconductor GeTe Shi-Jing Gong, Fan Zheng, and Andrew M. Rappe Phys. Rev. Lett. 121, 017402 -- Published 3 July 2018 DOI: 10.1103/PhysRevLett.121.017402. Phonon influence on bulk photovoltaic effect in the

Spontaneous polarization in ferroelectric materials leads to their use as photovoltaic devices. Here, the authors show by first-principles calculations how nanolayering of PbTiO_3 with nickel ions ...

ARTICLE Enhanced bulk photovoltaic effect in two-dimensional ferroelectric CuInP_2S_6 Yue Li^{1,2,5}, Jun Fu^{1,2,5}, Xiaoyu Mao^{1,2,5}, Chen Chen^{1,2}, Heng Liu^{1,2}, Ming Gong^{3,4} & Hualing Zeng^{1,2} The ...

The resultant response largely mimics ferroelectric switching which further validates the dominance of ferroelectric/bulk photovoltaic effect in these samples (Supplementary Fig. 3). It must be ...

Bulk ferroelectric photovoltaic effect

The bulk photovoltaic effect (BPVE) 1,2,3,4,5 in ferroelectric materials has been intensively investigated because of properties such as above bandgap photovoltage generation or the possibility of ...

The bulk photovoltaic effect (BPVE) is the direct conversion of solar energy into direct current (DC), which has been considered as a promising alternative source of photocurrent 2,3,4,5,6,7. As ...

A bulk photovoltaic effect is observed in devices based on tungsten disulfide, and is enhanced if the devices take the form of polar nanotubes, showing the importance of reducing crystal symmetry ...

The growth of layered 2D compounds is a key ingredient in finding new phenomena in quantum materials, optoelectronics, and energy conversion. Here, we report SnP₂Se₆, a van der Waals chiral (R3 space group) semiconductor with an indirect bandgap of 1.36 to 1.41 electron volts. Exfoliated SnP₂Se₆ flakes are integrated into high-performance field-effect transistors ...

The bulk photovoltaic effect (BPE) has drawn considerable attention due to its ability to generate photovoltages above the bandgap and reports of highly enhanced photovoltaic current when using nanoscale absorbers or nanoscale electrodes, which, however, do not lend themselves to practical, scalable implementation. ... In a bulk ferroelectric ...

experimental demonstration of the bulk photovoltaic effect behavior based on the 2D ferroelectric semiconductor a-In₂Se₃ caused by an out-of-plane polarization induced depolarization field.

Appropriate positioning of electrodes allows observation of a switch-like photovoltaic effect, i.e., ON and OFF state, by changing the helicity of circularly polarized light. The re-discovery photovoltaic effect in ferroelectrics has far reaching implications that have been till now demonstrated.

The ferroelectric photovoltaic (PV) effect has gained widespread attention in the past decade 1,2,3,4,5 because of its promising applications in solar energy harvesting 6,7,8, self-powered ...

The voltage generated in a noncentrosymmetric crystal due to the bulk photovoltaic effect (BPE) can greatly exceed the energy gap, however, the light energy conversion efficiency is extremely low. Here we show that the BPE is remarkably enhanced in the case of thin films. The measurements of the BPE in heteroepitaxial single domain ferroelectric ...

Giant infrared bulk photovoltaic effect is observed in tellurene and applied in neuromodulation. ... M. et al. Shift current photovoltaic effect in a ferroelectric charge-transfer complex. Nat.

The bulk photovoltaic effect that is intimately associated with crystalline symmetry has been extensively studied in various nonmagnetic materials, especially ferroelectrics with a switchable electric polarization. In order to further engineer the symmetry, one could resort to spin-polarized systems possessing an extra magnetic degree of freedom. Here, we investigate ...

The bulk photovoltaic effect in ferroelectric $\text{Pb}(\text{Zr}, \text{Ti})\text{O}_3$ thin films. Integr. Ferroelectr., 8 (1995), pp. 285-290, 10.1080/10584589508219662. View in Scopus Google Scholar. 15. W. Ji, K. Yao, Y.C. Liang. Bulk photovoltaic effect at visible wavelength in epitaxial ferroelectric BiFeO_3 thin films.

The bulk photovoltaic (BPV) effect in ferroelectric liquid crystals is of increasing scientific interest owing to its great potential for light-energy conversion. The ferroelectric nematic phase exhibits a huge spontaneous polarization that can be aligned to a preferred direction. In this Letter, we investigate the tensorial properties of the BPV effect in the planarly aligned ferroelectric ...

Using strain-gradient engineering, the flexo-photovoltaic effect, that is, the strain-gradient-induced bulk photovoltaic effect, can be activated in centrosymmetric semiconductors, considerably ...

The shift current (SHC) has been accepted as the primary mechanism of the bulk photovoltaic effect (BPVE) in ferroelectrics, which is much different from the typical p - n junction-based photovoltaic mechanism in heterogeneous materials. In the present work, we use first-principles calculations to investigate the SHC response in the ferroelectric semiconductor ...

The bulk photovoltaic effect (BPVE) originating from spontaneous charge polarizations can reach high conversion efficiency exceeding the Shockley-Queisser limit. Emerging van der Waals (vdW) ...

Ever since the first observation of a photovoltaic effect in ferroelectric BaTiO_3 , studies have been devoted to analyze this effect, but only a few attempted to engineer an enhancement. In conjunction, the steep progress in thin-film fabrication has opened up a plethora of previously unexplored avenues to tune and enhance material properties via growth in the form of ...

The bulk photovoltaic (BPV) effect is among the most promising bulk functionalities. It refers to a nonlinear absorption process that intrinsically converts light into electrical current in bulk materials lacking inversion symmetry [3, 4]. This nonlinear mechanism is thus expected to revolutionize the field of photodetection by opening a new route toward high-performance, self ...

Bulk ferroelectric photovoltaic effect (BFPVE) is a fascinating phenomenon with many unique features, such as extremely large photovoltage, where a photocurrent is proportional to the polarization magnitude and charge carrier separation in homogeneous media (Ji et al., 2010). In BFPVE, the remnant polarization and the polarization-induced ...

Here we report that a popular all-inorganic halide perovskite nanocrystal, CsPbBr_3 , exhibits a ferroelectricity-driven photovoltaic effect under visible light in the absence of an ...

The anomalous photovoltaic effect and resistive switching behaviors in ferroelectric materials attract much attention in recent years. Dozens of researches revealed that the two effects coexist and affect each other in

Bulk ferroelectric photovoltaic effect

electrode/ferroelectric/electrode structures. Therefore, the conductive mechanisms and research progresses of the two effects were discussed in this ...

The bulk photovoltaic effect (BPVE), sometimes also called the photogalvanic effect (PGE), refers to the electric current generation in a homogeneous material under light illumination, in contrast to the traditional ...

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