Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Low Frequency Noise and Photosensitive Field Emission from Ultrathin $PbBi_2Se_4$ Nanosheets

Sachin R. Suryawanshi, Satya N. Guin, Arindom Chatterjee, Vikas kashid, Mahendra A. More, Dattatray J. Late,* Kanishka Biswas**

Sachin R. Suryawanshi, Vikas Kashid and Dr. Mahendra A. More
Centre for Advanced Studies in Materials Science and Condensed Matter Physics, Department of Physics, University of Pune, Pune 411007, India

Satya N. Guin, Arindom Chantterjee and Dr. Kanishka Biswas
New Chemistry Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur PO, Bangalore 560064, India

Dr. Dattatray J. Late
Physical and Materials Chemistry Division, CSIR-National Chemical Laboratory, Dr. Homi Bhabha Road, Pashan, Pune- 411008, India

*E-mail: *datta099@gmail.com, mam@physics.unipune.ac.in, kanishka@jncasr.ac.in*

Figure S1

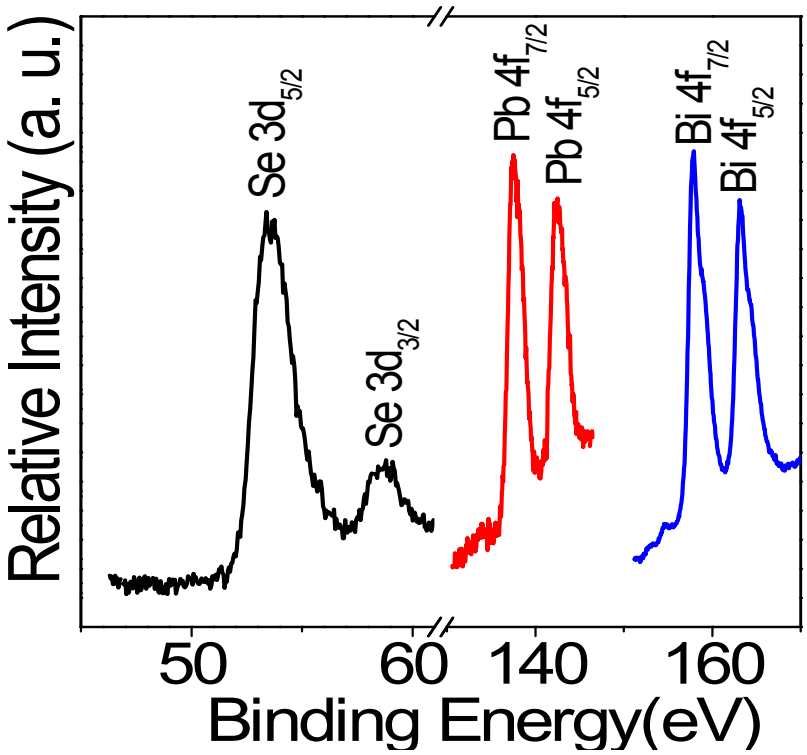

Figure S1: XPS spectra of the $PbBi_2Se_4$ nanosheets showing $Se3d_{5/2}$, $Se3d_{3/2}$, $Pb4f_{7/2}$, $Pb4f_{5/2}$, $Bi4f_{7/2}$ and $Bi4f_{5/2}$ states.[25]

Figure S2

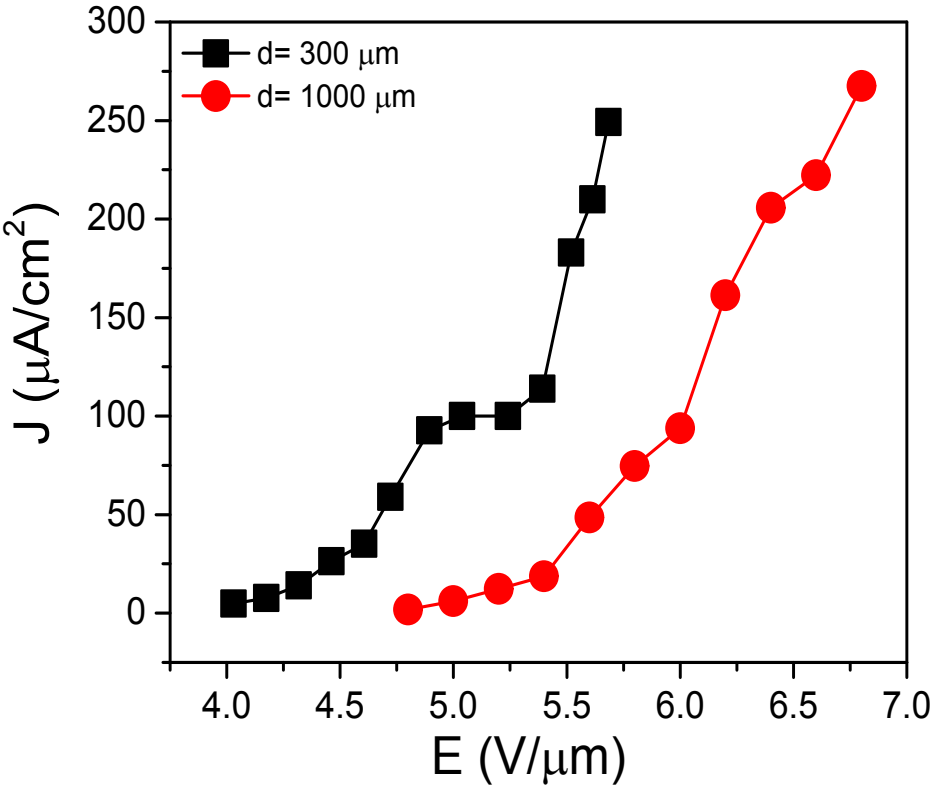

Figure S2: Observed J-E characteristic of $PbBi_2Se_4$ nanosheets at d= 300 and d= 1000 μm distances.

Table S1: Comparison table of turn on value and threshold value for d= 300 and d= 1000 μm distances.

$PbBi_2Se_4$ nanosheets	**Turn-on field (for 1 μA/cm²**	**Threshold field (for 10 μA/cm²)**	**Max current density of μA/cm²**
d= 300 μm	~ 4.00 V/μm	~4.30V/μm	~249 μA/cm²
d= 1000 μm	~ 4.80 V/μm	~5.00V/μm	~267 μA/cm²

Figure S3

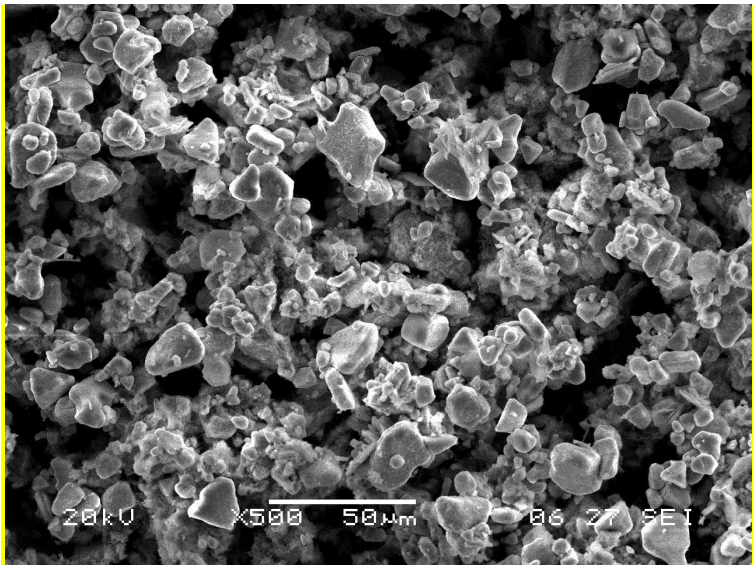

Figure S3 SEM image of the extracting anode (semitransparent cathodoluminescent Phosphor screen).