Electronic Supplementary Material (ESI) for CrystEngComm.
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Supporting Information

Single and Twin Plates of 2D Layered BiI3 for Use as Nanoscale Pressure Sensors

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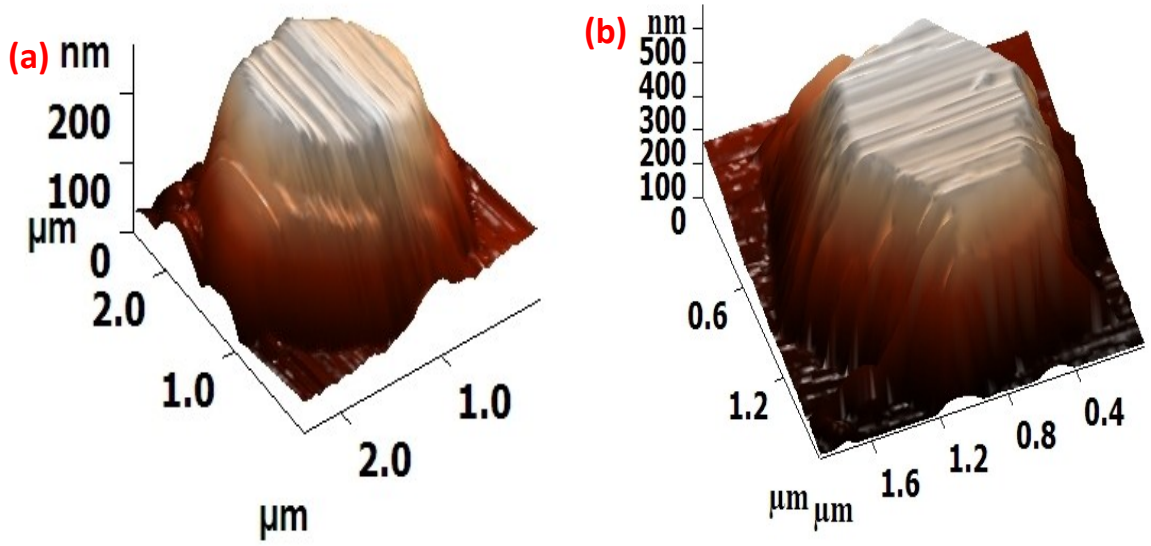

Figure S1. AFM Topography image of 1:5 mmoles hexagonal plate (a) and (b) Twin plated morphology of 2:10 mmoles concentration.

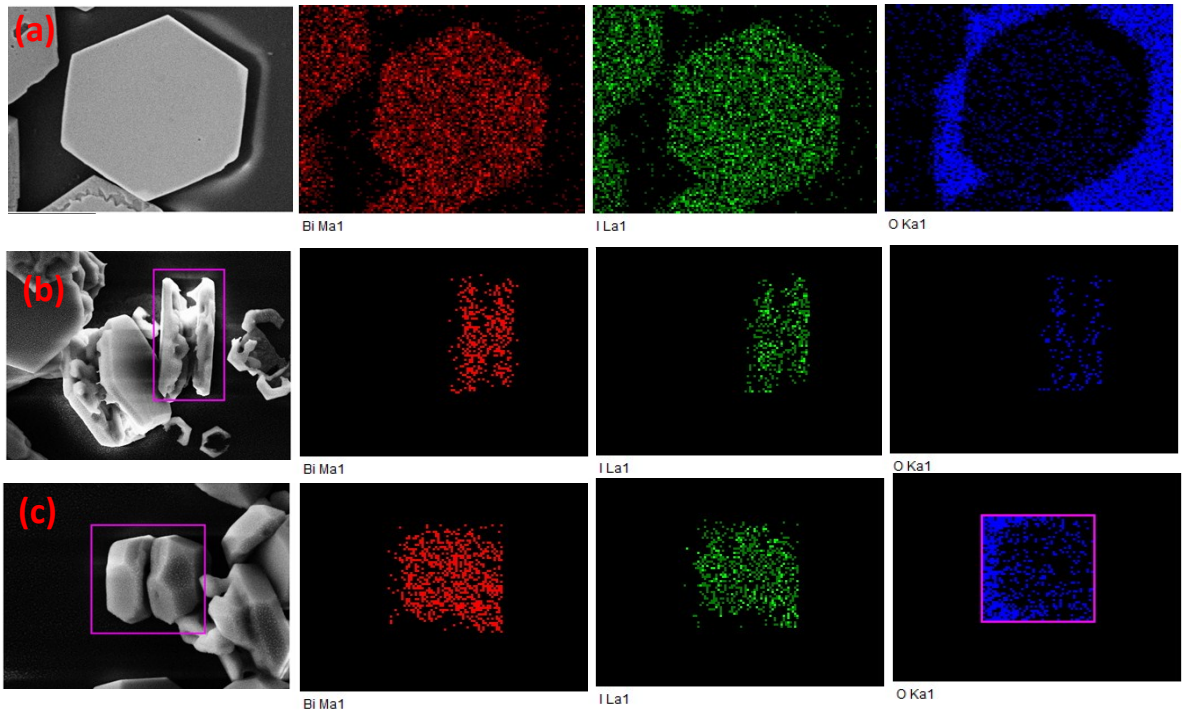

Figure S2. FESEM images of EDAX area mapping of BiI3 different concentration (c, mmoles) of Bi3+ and I- :(a) 1:5 hexagonal,(b) 2:10 Twin plates and (c)4:20, twin plates: scale bar =200 nm. The EDX mapping show Bi (Red), I (green) and O (blue) regions are selected.

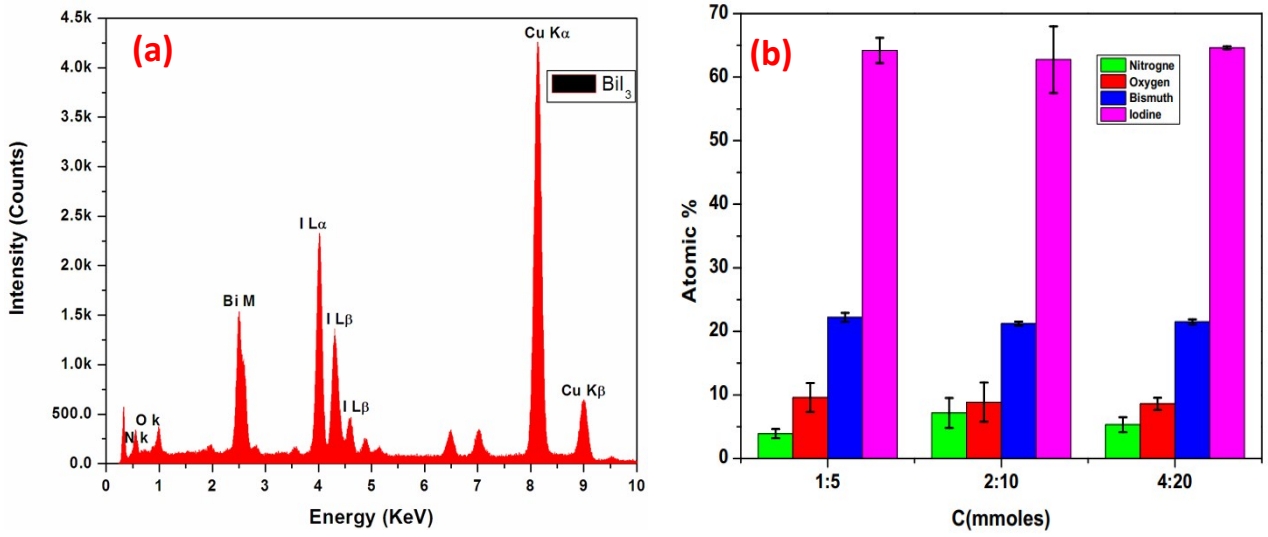

Figure S3. TEM images of EDAX elemental analysis of BiI3 (a) and (b) Atomic percentage of three different concentrations of Bi^{3+} and I^-.

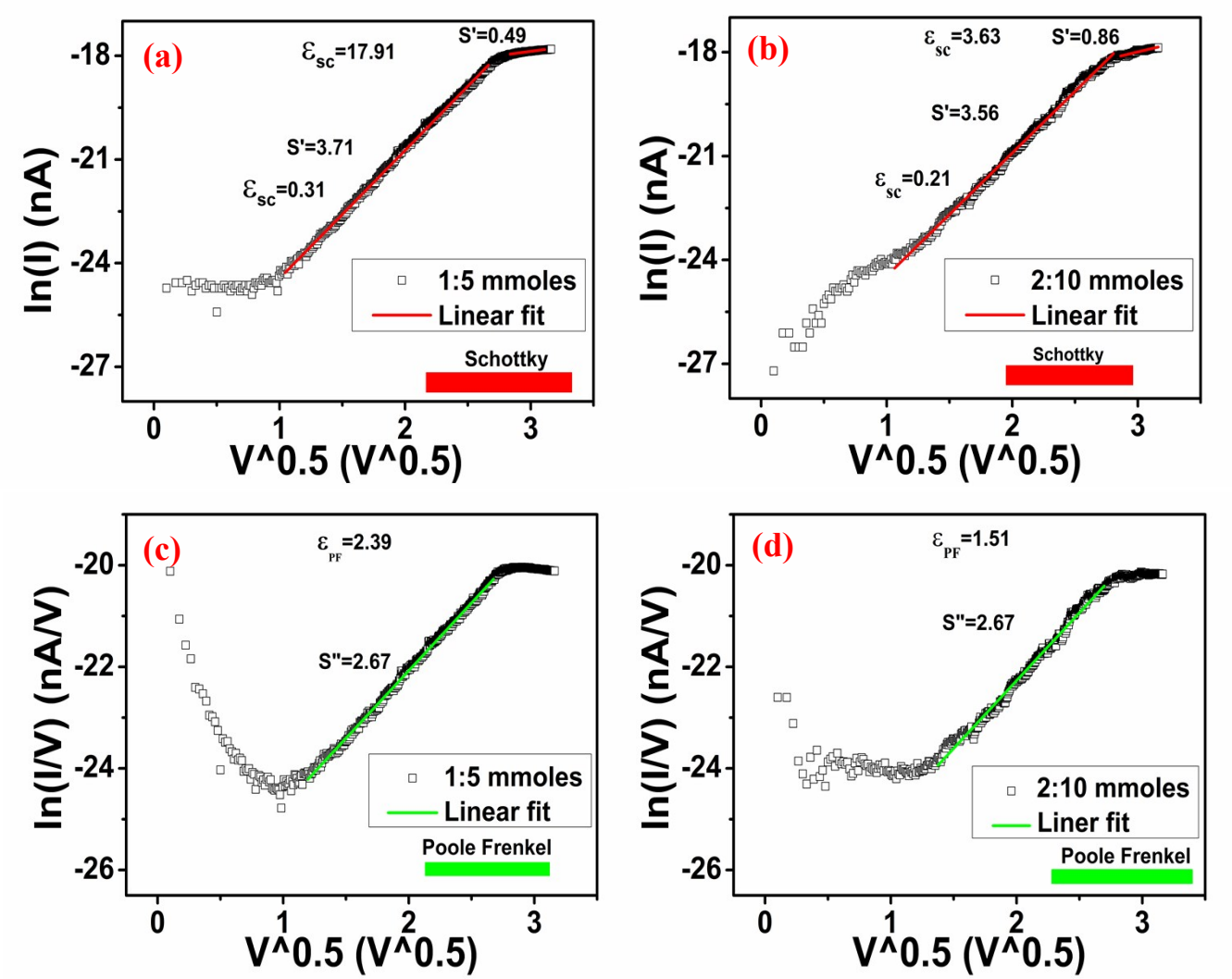

Figure S4. Figure 2: a) &b) Schottky model curves and c) &d) Poole frenkel curve of Single NPs and Twin NPs samples respectively.

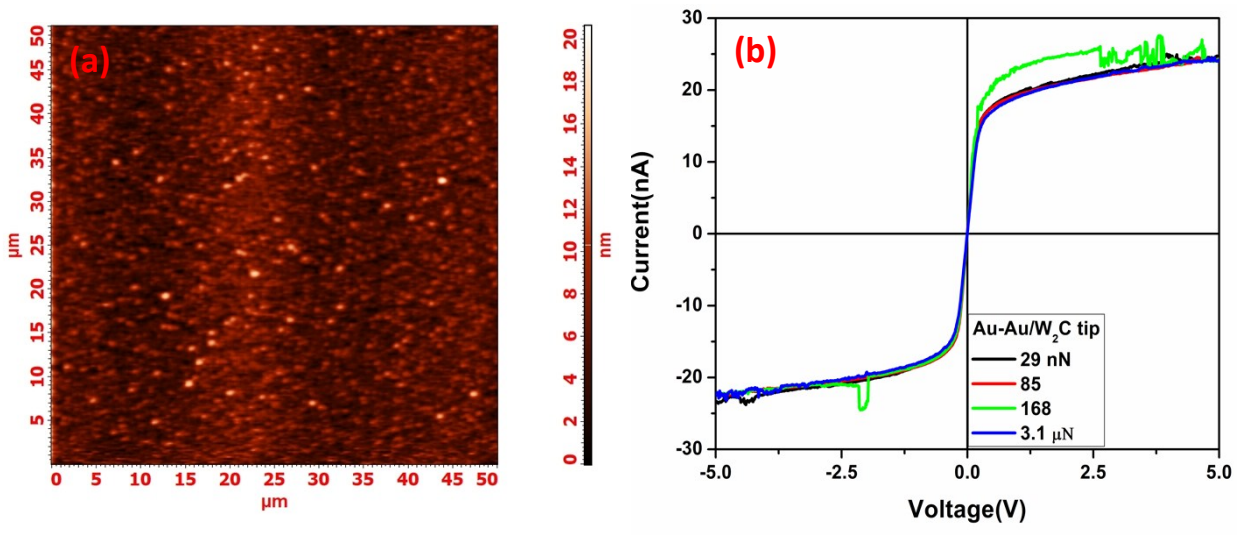

Figure S5. AFM images of Au substrate (a) and (b) I-V characteristics of Au substrate and AFM tip at different pressures.

Estimation of the Active Area

To estimate the active area between AFM probe and sample, we used Derjaguin-muller – Toporov (DMT) continuum mechanical model. The active contact area, A. is given by

$$A = \ Ï€\left[\frac{R}{K}(L + 2Ï€RÎ^3)\right]^{2}/_{3}$$

Where K is the reduced Young's Modulus

$$\frac{1}{K} = \frac{3}{4}\left(\frac{1 - Î½_s^2}{E_s} + \frac{1 - Î½_t^2}{E_t}\right)$$

E_t and E_s are young's moduli and V_t and V_s are the Poission ratios of the tip and sample, respectively. (E tin=) R is the tip radius (~ 35 nm) and L is applied load (~0 nN). 2π R γ is adhesion force (37 ± 1.2 nN) between tip and sample related to the work of adhesion γ

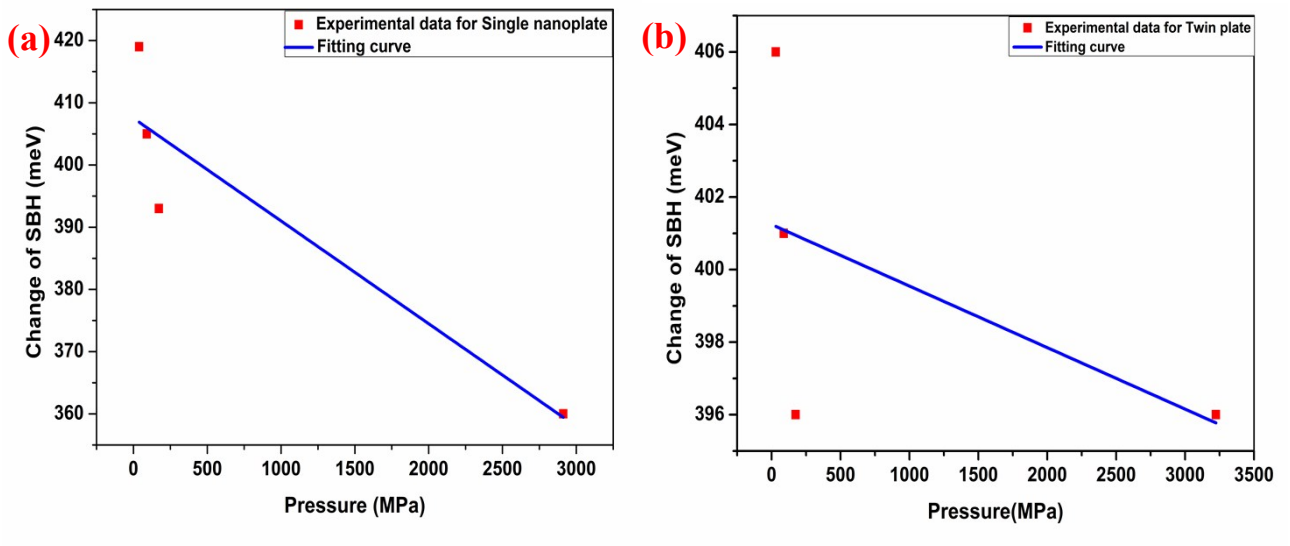

Figure S6. Calculated SBH changes as a function of applied pressure, (a) single plate and (b) twin platelets respectively

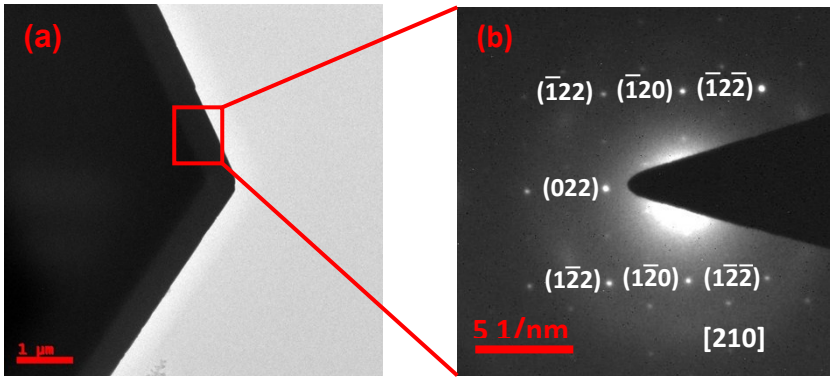

Figure S7. TEM bright field side facets image (a) and the corresponding SAED patterns of BiI_3 crystal are index with their [210] zone axis