An Insight into the 3D Architecture and Quasicrystal Symmetry of Multilayer Nanorod Assemblies from Moiré Interference Patterns

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Supporting Information

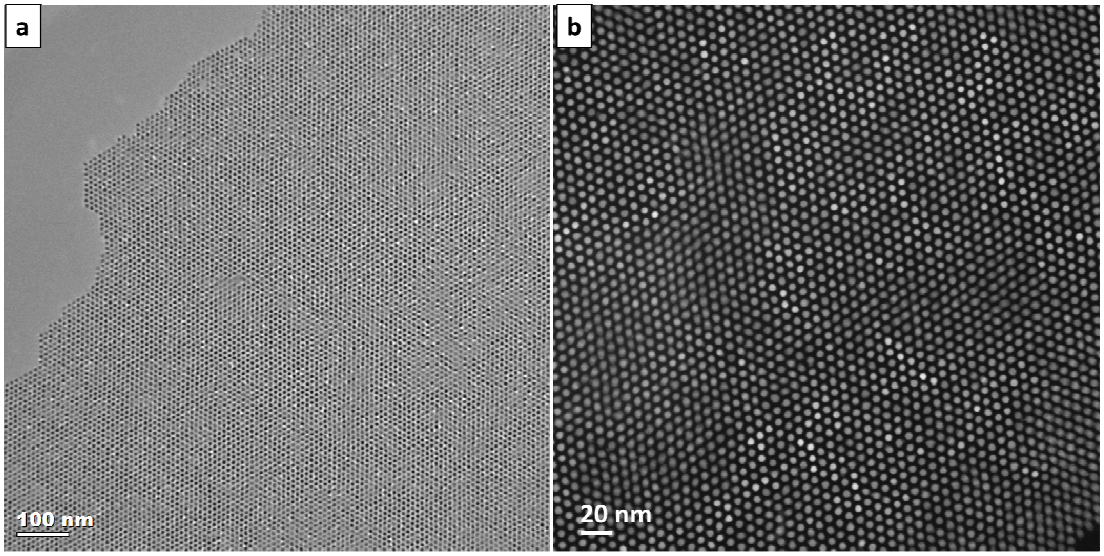

Figure S1: (a) Low magnification TEM image shows monolayer of vertically aligned close-packed CdS nanorods. Higher magnification DF-STEM image reveal defect-free 2D sheet of CdS nanorods.

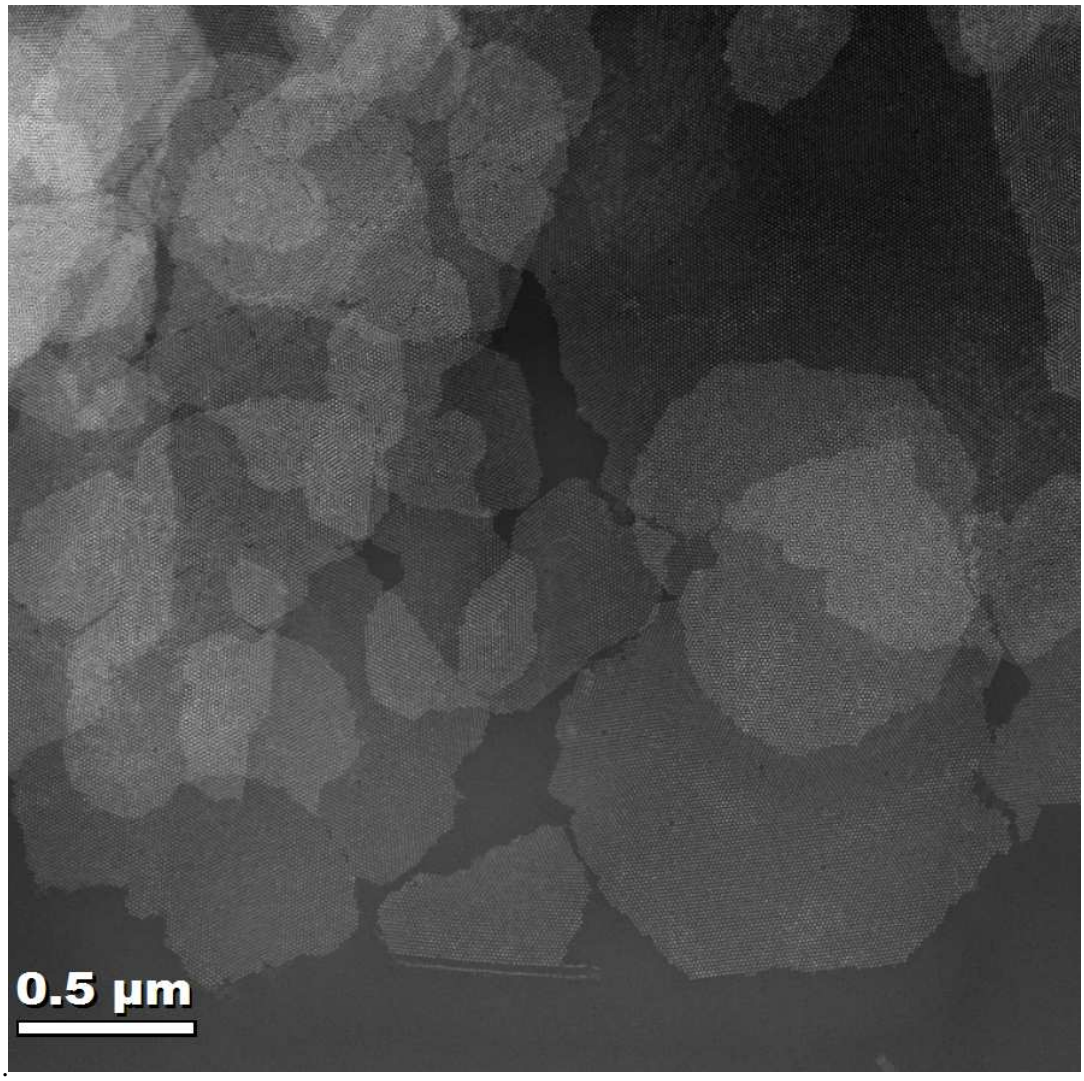

Figure S2: Low magnification DF-STEM image showing the multilayer, vertical assembly of CdS nanorod superstructures over micron sized area and different Moiré pattern revealed in these superstructures.

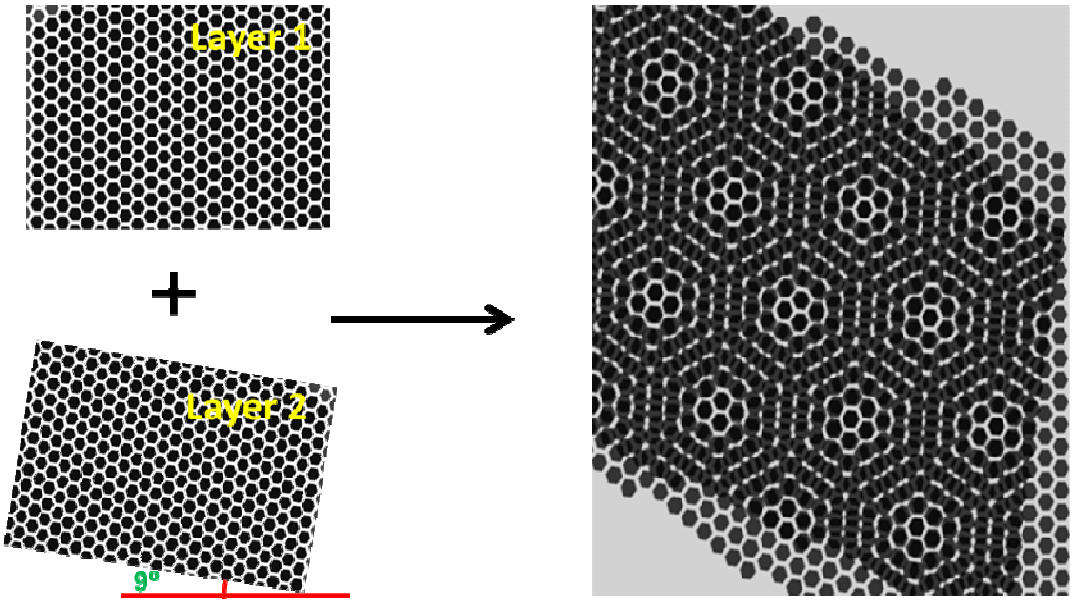

Figure S3: Schematic representation of Moiré pattern formed by superposition of two hexagon patterns (layer 1 & 2) with 9° rotation angle.

Table S4:

Rotational moiré equation (1) $$D_{rm} = \frac{d}{2\sin\left(\frac{\alpha}{2}\right)}$$

Where d is the d-spacing of the supercell (d =10 nm) and alpha is the rotation angle

Degree rotation	D_{motif} (nm)	D_{rm} (nm)
5	116	114.6279281
9	65	63.72747422
13	47	44.16835736
17	35	33.82734538
26	26	22.22705741
29	19	19.96964581

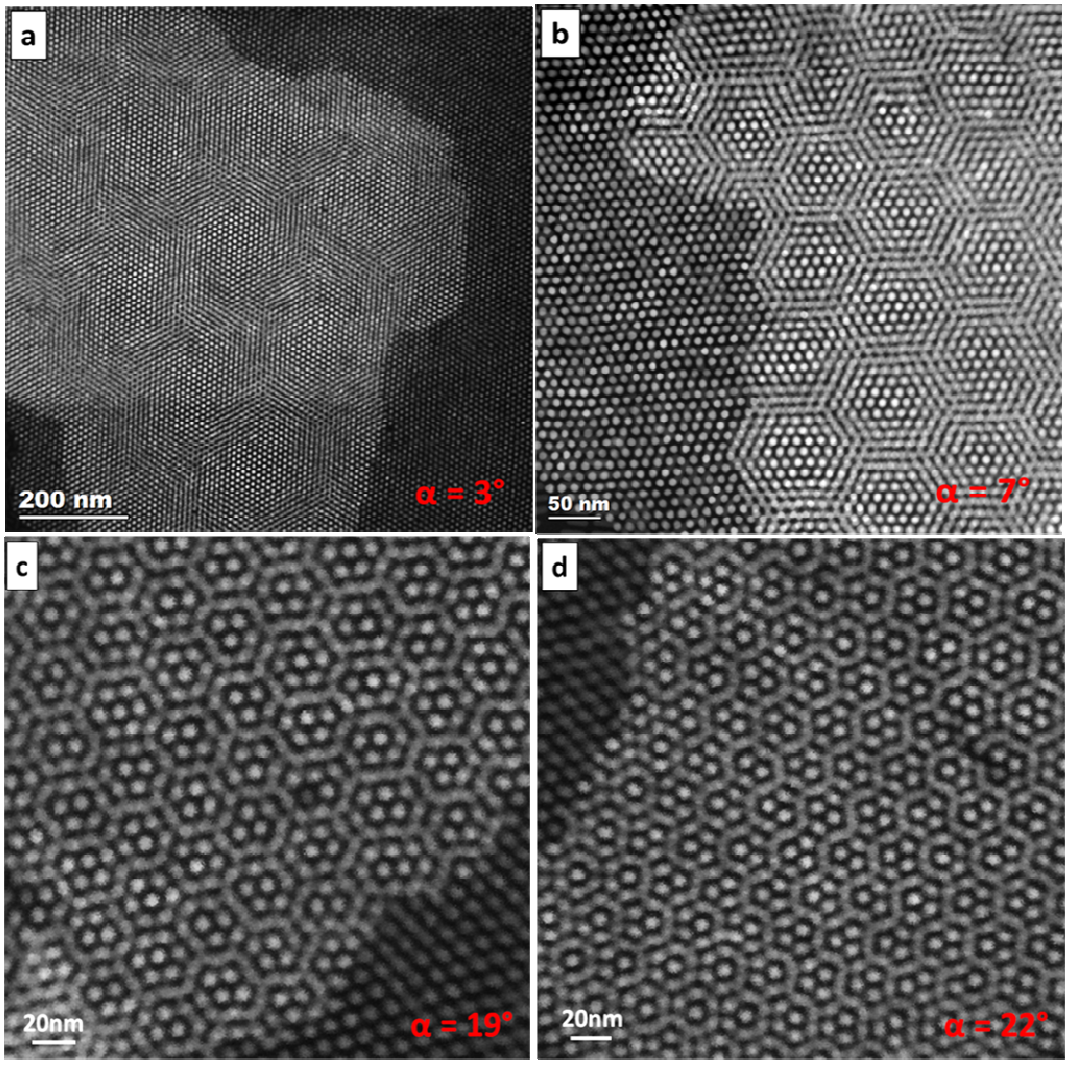

Figure S5: (a-d) DF-STEM images of Moiré patterns revealed with misorientation angle of (a) ~ 3°, (b) ~7°, (c) ~19°, (d) ~22° respectively.

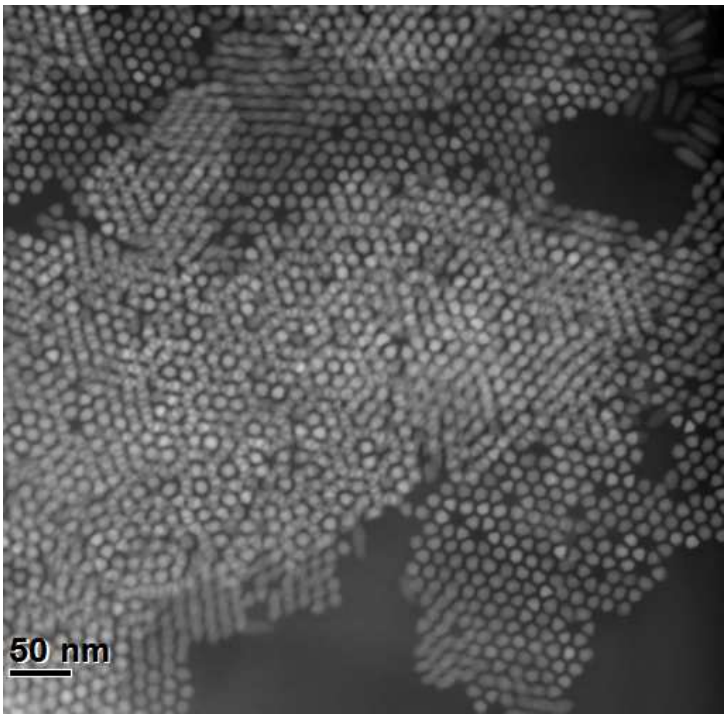

Figure S6: Moiré pattern revealed in "rice shaped" CdSe nanorods. As these nanorods assembly have pinholes which ultimately leads to disrupt the aperiodicity and no long range ordering can be seen in the above DF-STEM image

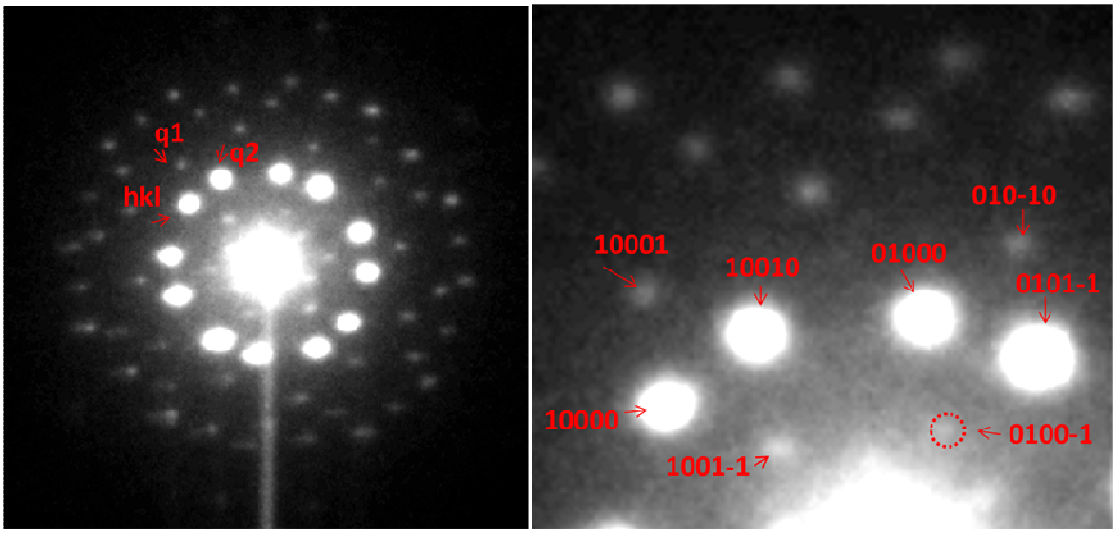

Figure S7: Example of indexing the SAED pattern from a Moiré pattern with 26° rotation. In order to index all the satellite spots in the pattern, the standard miller indices (hkl) are not suitable alone. Two modulation vectors are required to index the satellite spots, indicated as q1 and q2, and to fully index the pattern in the form (hklmn). The image on the right indicates the hklmn indices for the Moiré diffraction/FFT patterns. All of the rotational Moiré patterns, figure S8, can be indexed in a similar fashion.

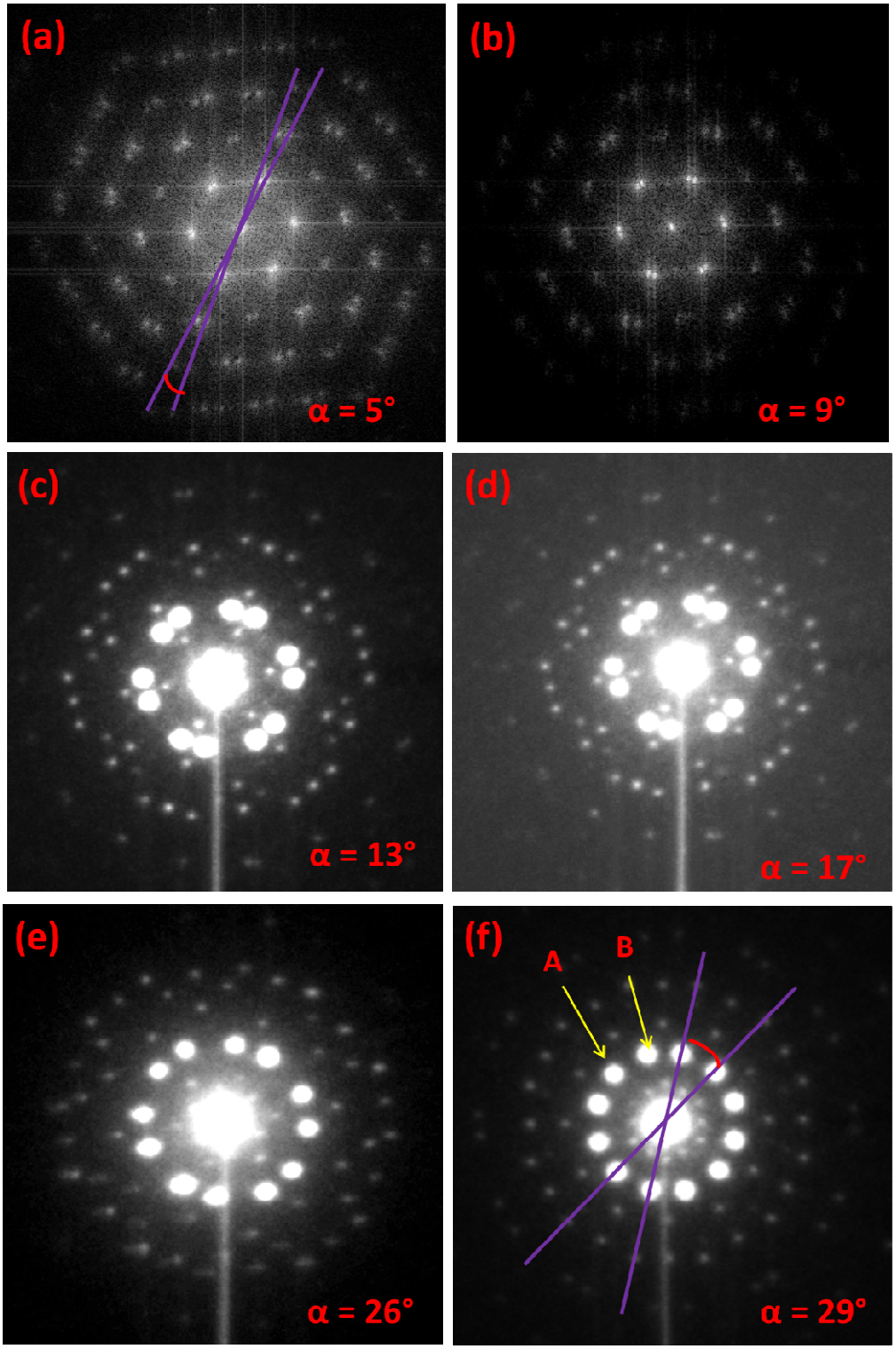

Figure S8: Fast Fourier Transforms (FFTs) and Small Angle Electron Diffraction (SAED) for all six different Moiré pattern arising upon the stacking of two CdS nanorod assembled sheets.

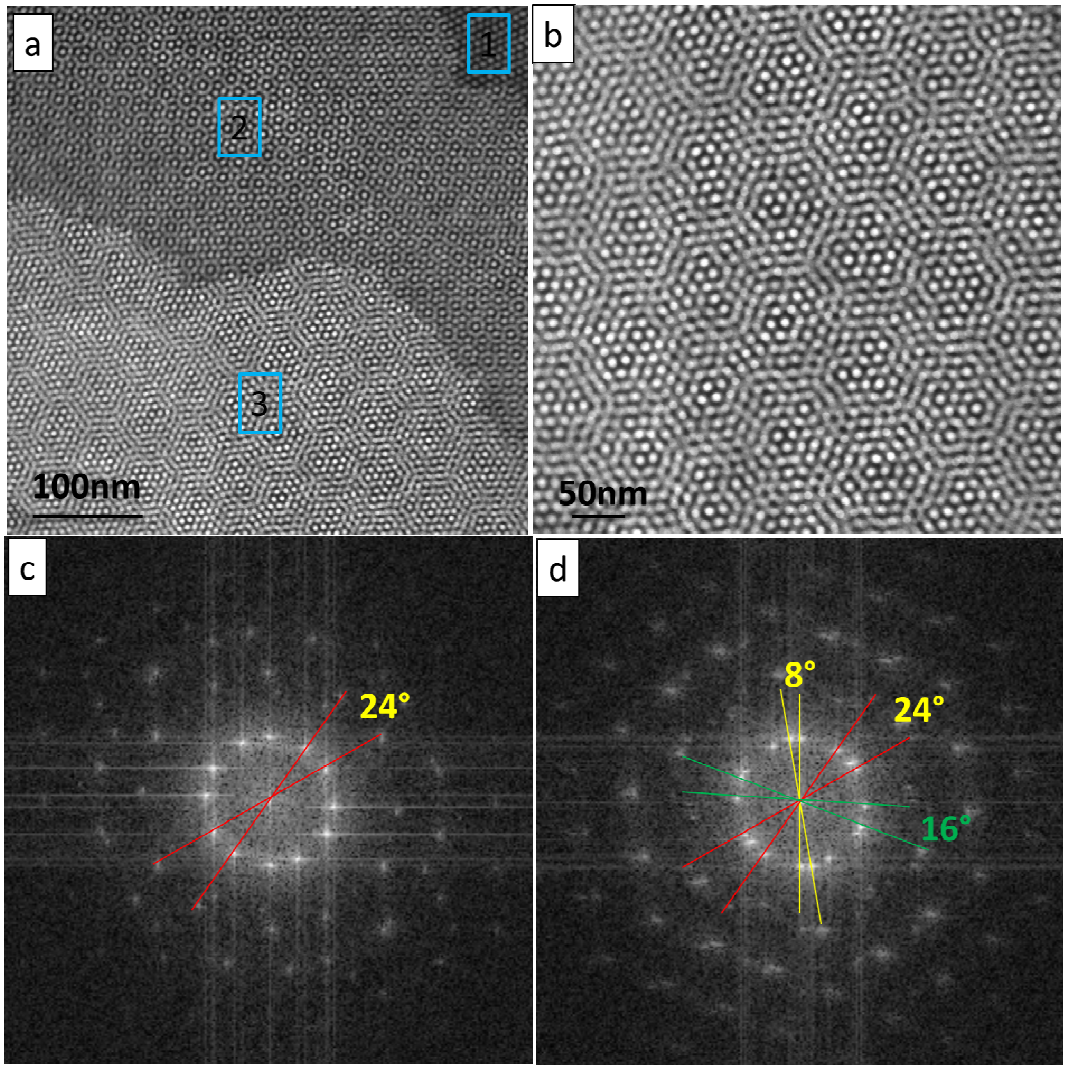

Figure S9: DF-STEM image shows CdS superlattice consisting of three layers. (b) High-resolution DF-STEM image of the region indicated as 3 showing a complex Moiré´ pattern due to the relative rotations of the three layers. (c) FFT of region indicated as 2 shows two hexagonal spot with misorientation angle of 24°. (d) FFT of region indicated as 3 showing three sets of hexagonal spots corresponding to three different CdS layer with misorientation angle with respect to each other is measured as 8°, 24° and 16°.

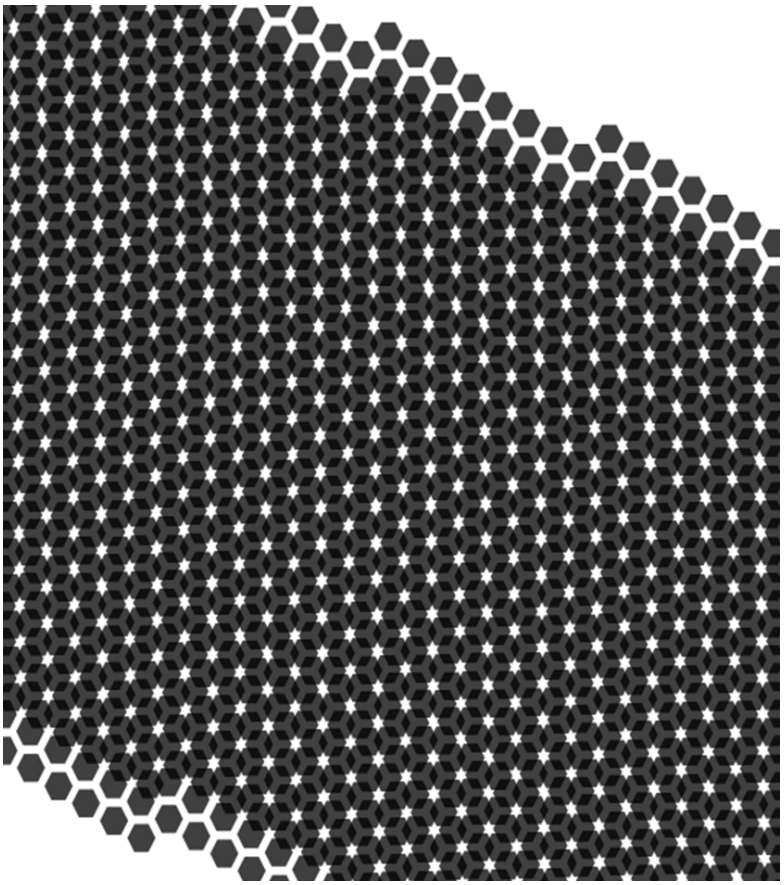

Figure S10: Schematic representation of lateral shift formed by superposition of two hexagon patterns with ~ ¼ lateral shift**.**