Supplementary Information

Morphology controlled synthesis of one-dimensional BTR micro-ribbon and two-dimensional single-crystal film for field-effect transistors

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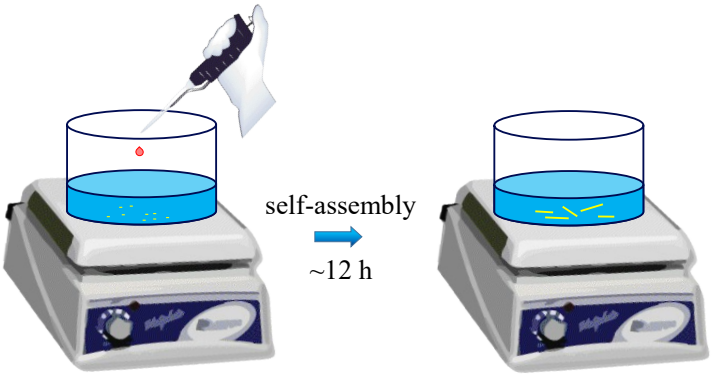

Fig. S1 Schematic of BTR micro-ribbon preparation with self-assembly process of the reprecipitation in liquid.

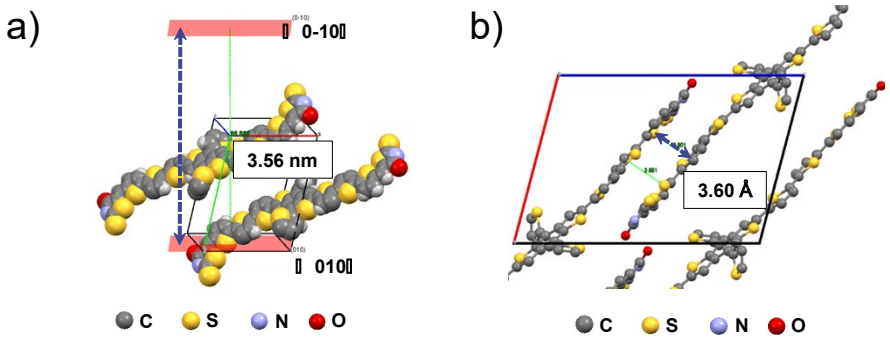

Fig. S2 a) Side view of the crystal structure with b axis standing on the substrate (layer distance ~1.8 nm); b) The π-stacked centrosymmetric dimers of BTR molecules in the single crystal, the alkyl side chains have been omitted for clarity.

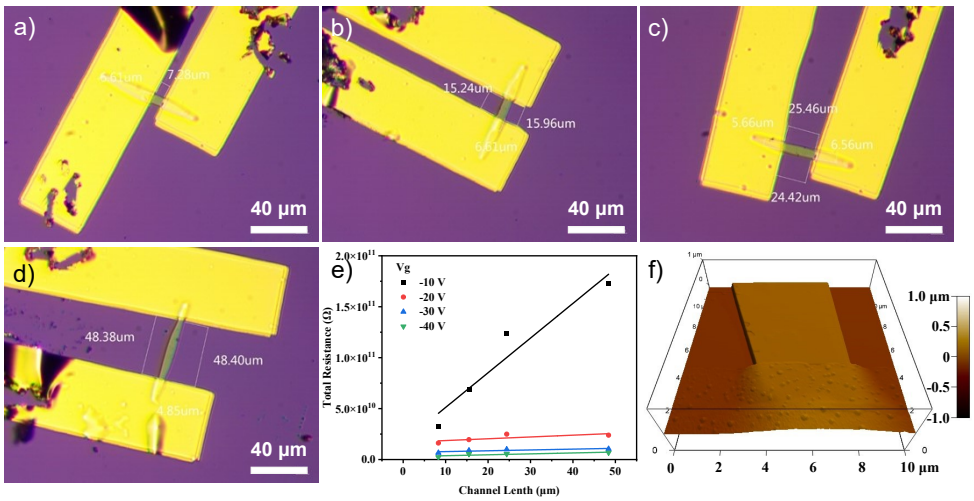

Fig. S3 a-d) Optical microscopy image of BTR micro-ribbon between drain and source electrodes with different channel length. e) The curves of R_{tot} (total resistance)-L (channel length) of this ribbon. f) AFM 3D image of this ribbon (~210 nm).

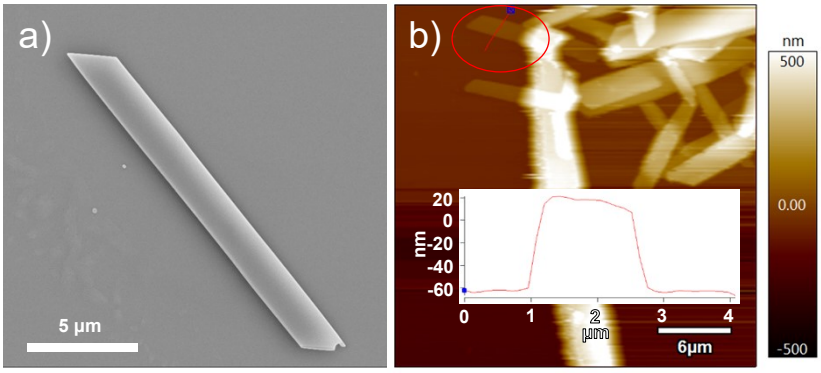

Fig. S4 a) SEM image of little BTR ribbon (with length ~16 μm). b) AFM image of little BTR ribbons (with thickness ~80 nm).

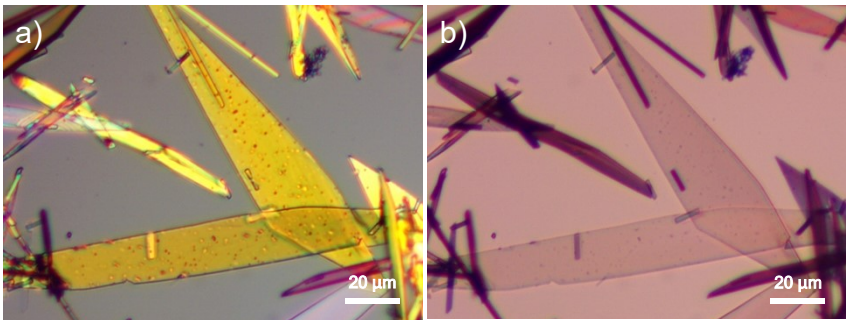

Fig. S5 a-b) Optical microscopy images of BTR micro-ribbon (under reflected and transmitted light).

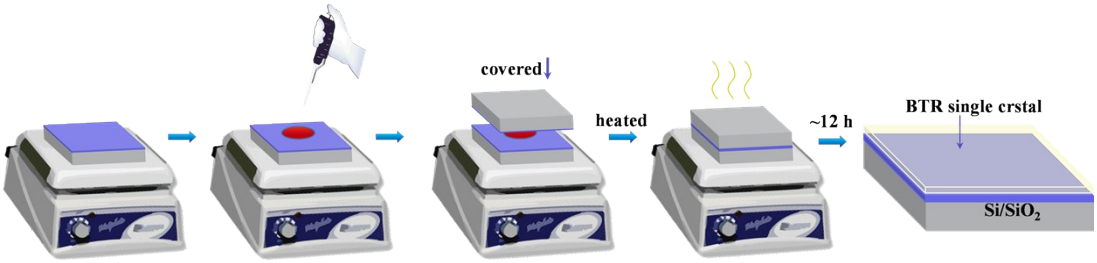

Fig. S6 The preparation process of the 2D crystal of BTR.

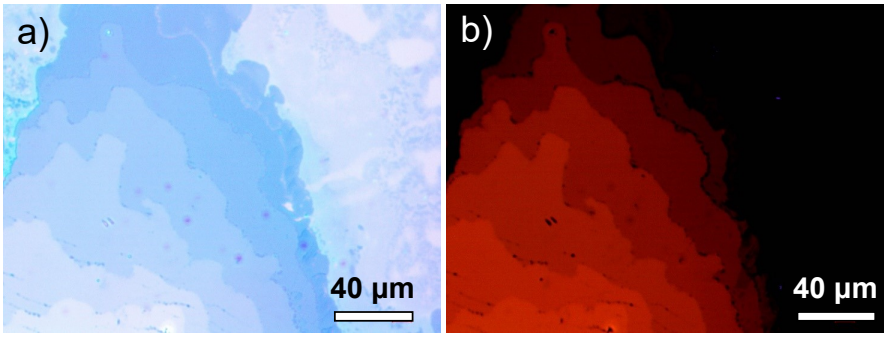

Fig. S7 The image of stripes caused by molecular-layer steps under the optical microscopy image a) and cross-polarized optical microscopy b).

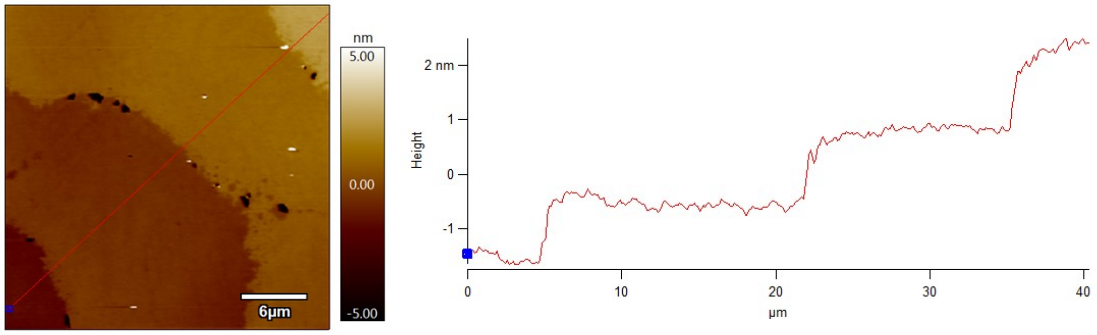

Fig. S8 The AFM (left) and height profile (right) image of BTR 2D single crystal, which is show the step-and-terrace structure.

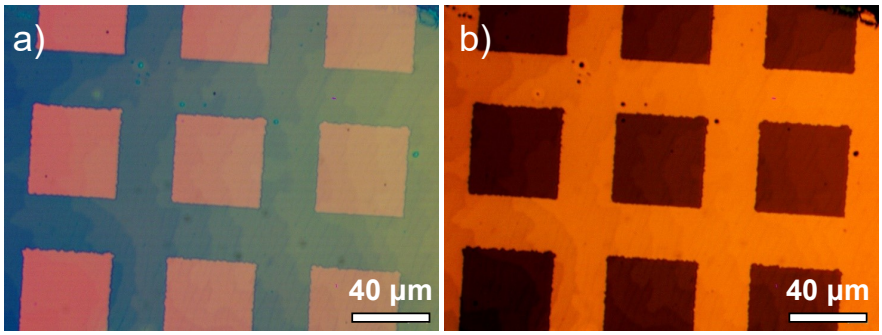

Fig. S9 a) Optical microscopy and b) Polarized microscope image of BTR 2D single crystal after Au electrode vaporization (these small squares are the Au electrodes).

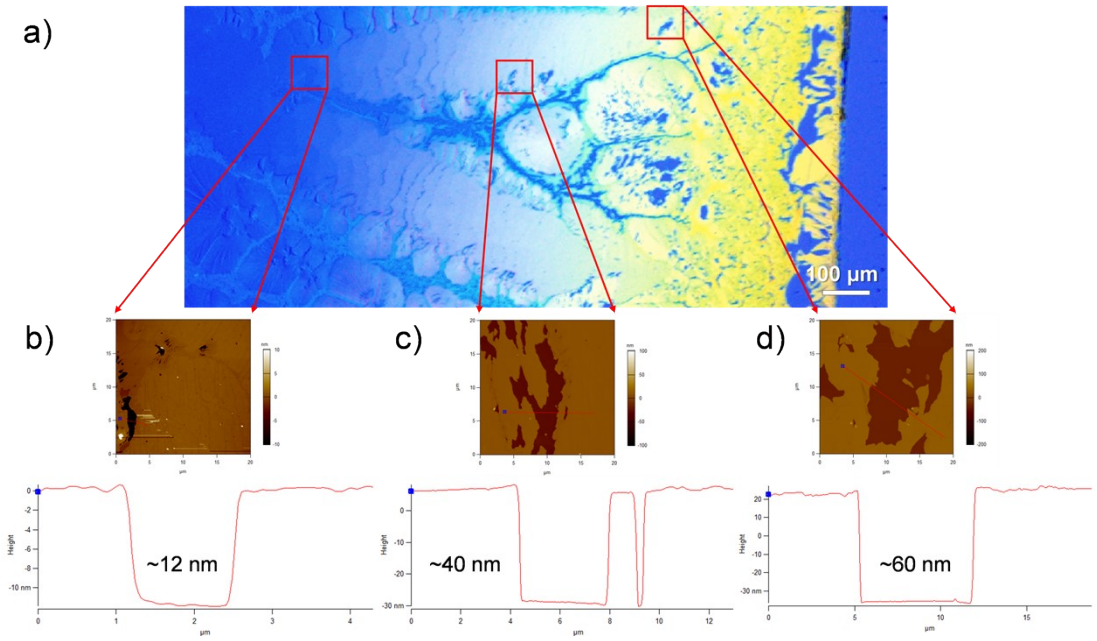

Fig. S10 a) Optical microscopy image of BTR 2D crystal. b-d) AFM images and corresponding thickness of the red box in a).

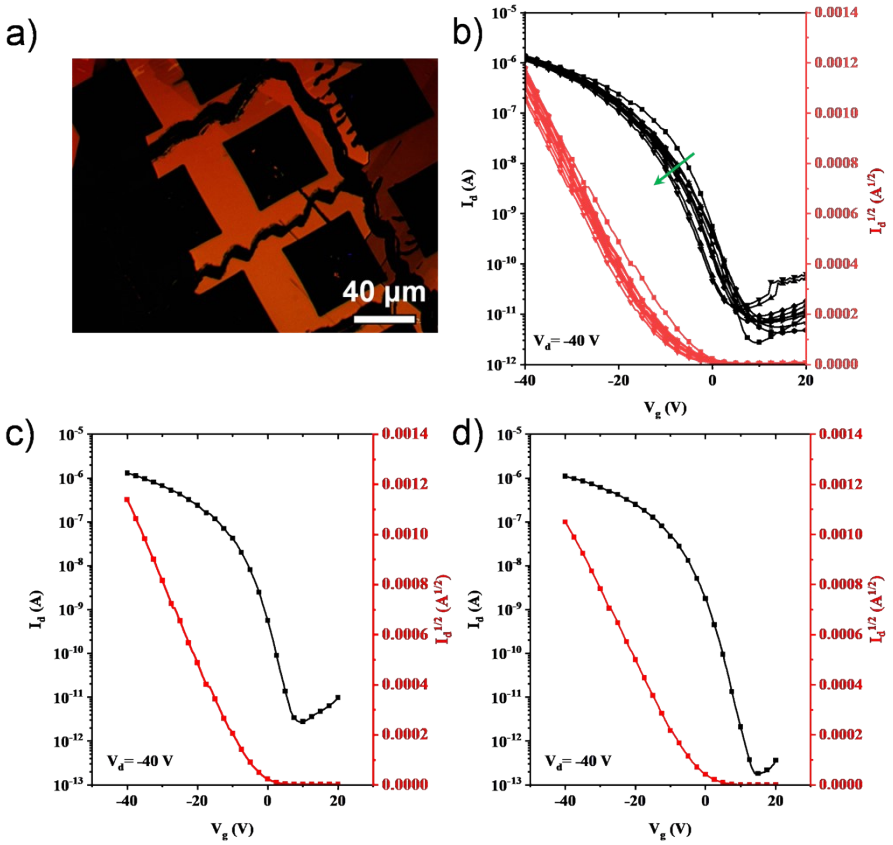

Fig. S11 a) Optical microscopy images of the 2D crystal devices. b) The transfer characteristics cycle tests of the 2D crystal devices. c-d) the transfer of before and after ill-defined the electrode shapes.

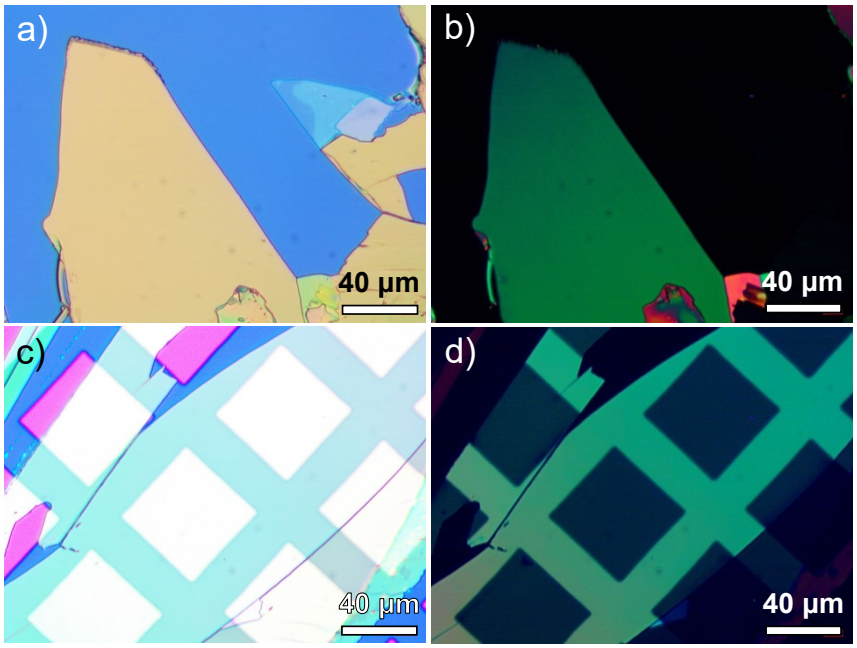

Fig. S12 a) Optical microscopy and b) Polarized microscope image of thick BTR 2D single crystal from the edge of the substrate. c) Optical microscopy and d) Polarized microscope image of thick BTR 2D single crystal after Au electrode vaporization (these small squares are the Au electrodes).

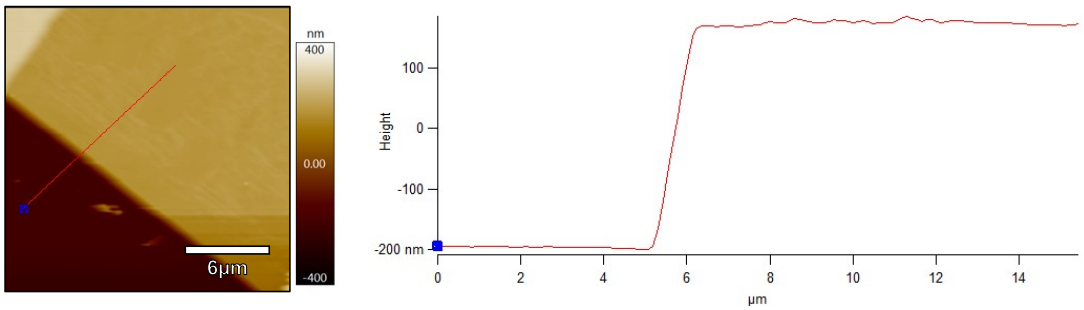

Fig. S13 The AFM (left) and height profile (right) image of thicker BTR 2D crystal

from the edge of substrate (~375 nm).

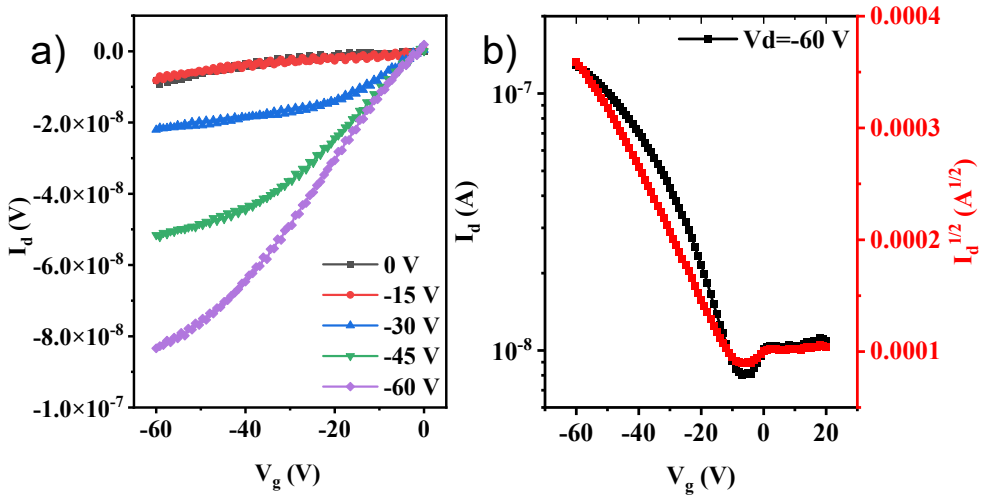

Fig. S14 The out-put a) and transfer b) of BTR 2D single crystal (thicker).

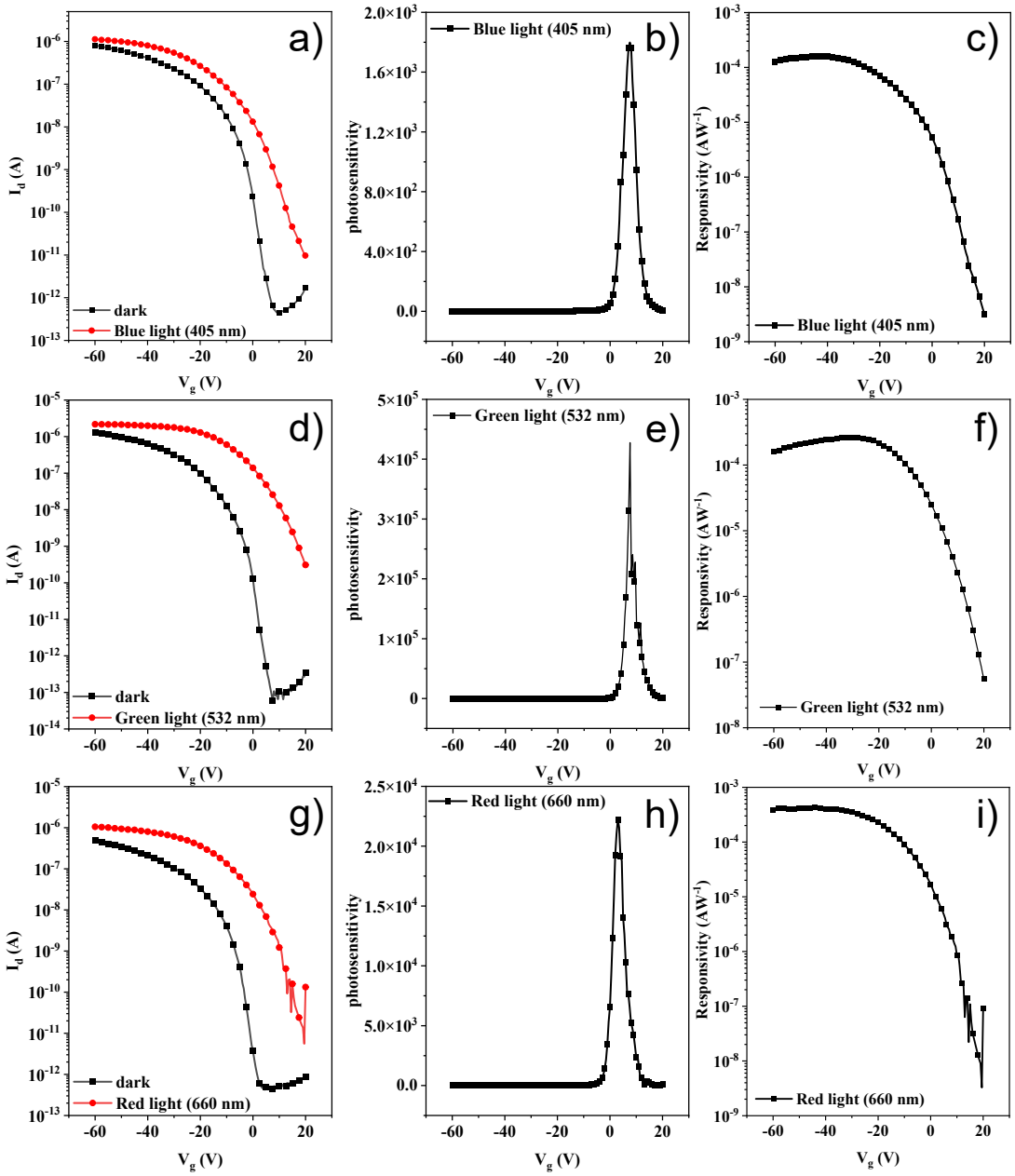

Fig. S15 a, d, g) The transfer curves (V_{ds}=-80 V) of BTR 2D crystal were measured in dark and light illumination (405 nm, 532 nm, and 660 nm). b, e, h) Photosensitivity and responsivity c, f, i) extracted from a) on gate voltage ~7V.