Electronic supplementary information (ESI)

Fast and Low-Temperature Synthesis of One-Dimensional (1D) Single-Crystalline SbSI Microrod for High Performance Photodetector

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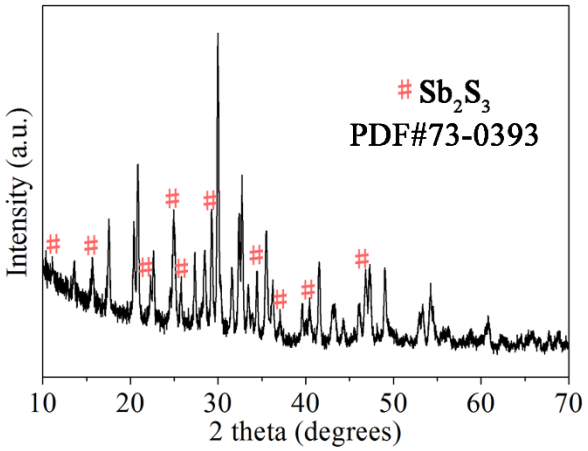

Figure S1. XRD pattern of SbSI obtained with impurity of Sb_2S_3 (#) in a relative low concentration hydrochloric acid solution (0.4 mol/L).

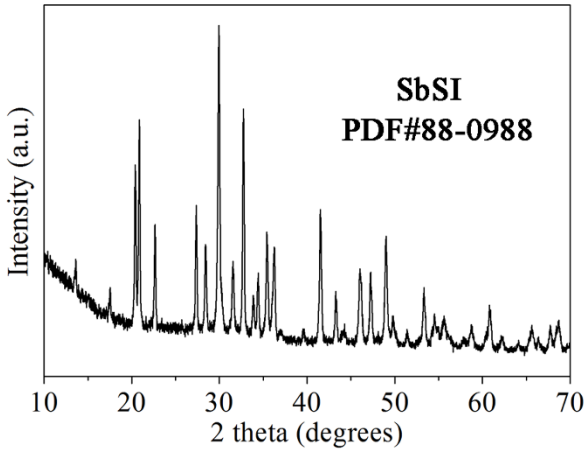

Figure S2. XRD pattern of SbSI obtained at 1.8 mol/L of hydrochloric acid solution.

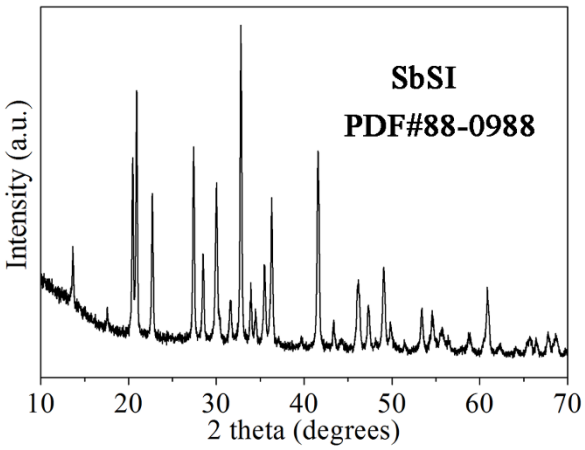

Figure S3. XRD pattern of SbSI obtained at 2.4 mol/L of hydrochloric acid solution.

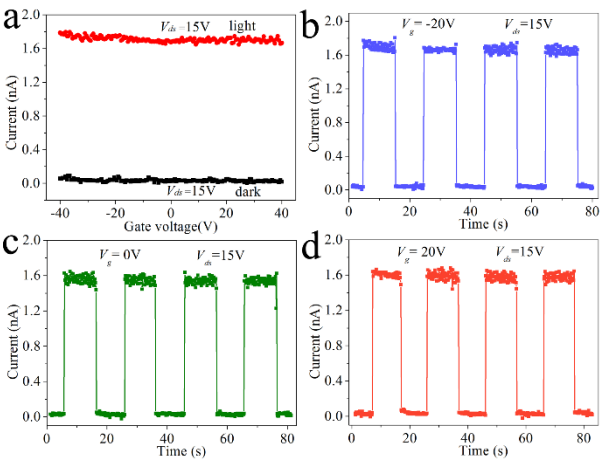

Figure S4. (a) Gate voltage dependences of the current under dark state and under light illumination at light intensity of about 32 mW/cm^2 and an applied source-drain voltage (V_{ds}) of 15 V, and (b), (c) and (d) the photoresponse of the device at constant source-drain voltage at different gate voltage of -20V, 0V and 20V, respectively, with constant light intensity.

To investigate the dependence of the photoconductivity on gating voltage (V_g) under illumination, some additional measurements were conducted, as shown in Figure S4. Figure S4a depicts the typical I_{ds}–V_g curves of the device under dark and light illumination, respectively. V_g was applied to the degenerately doped Si substrate, which serves as the global back-gate in the field emission transistor (FET). It is clear that the conduction current of the device as noise level as 10^{-12}A under dark at varied gate voltages from -40 V to 40 V. Meanwhile, the device also exhibits obvious photoresponse characteristics at varied V_g, and the photocurrent does not show obvious dependence on gating voltage, which can be further seen from the time response properties at different V_g, as shown in Figure S4 b-d. Therefore, in the current study, the photoconductivity of the device does not show obvious dependence on gating voltage. The weak gate coupling caused by dielectric SiO_2 with a large thickness (~300 nm) and back-gate structure is an important reason for the not-so-good performances.