



Journal Name

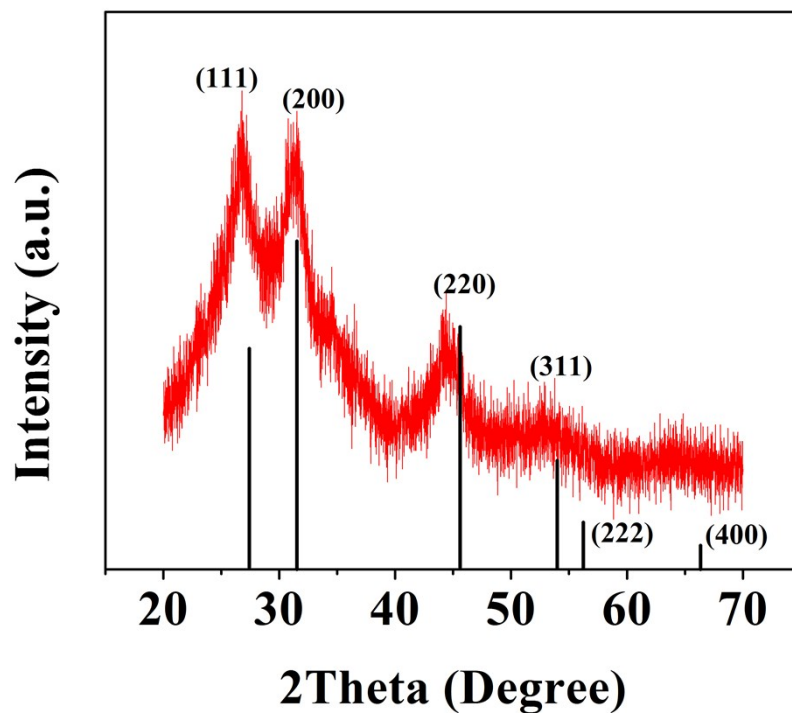
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## Supporting information

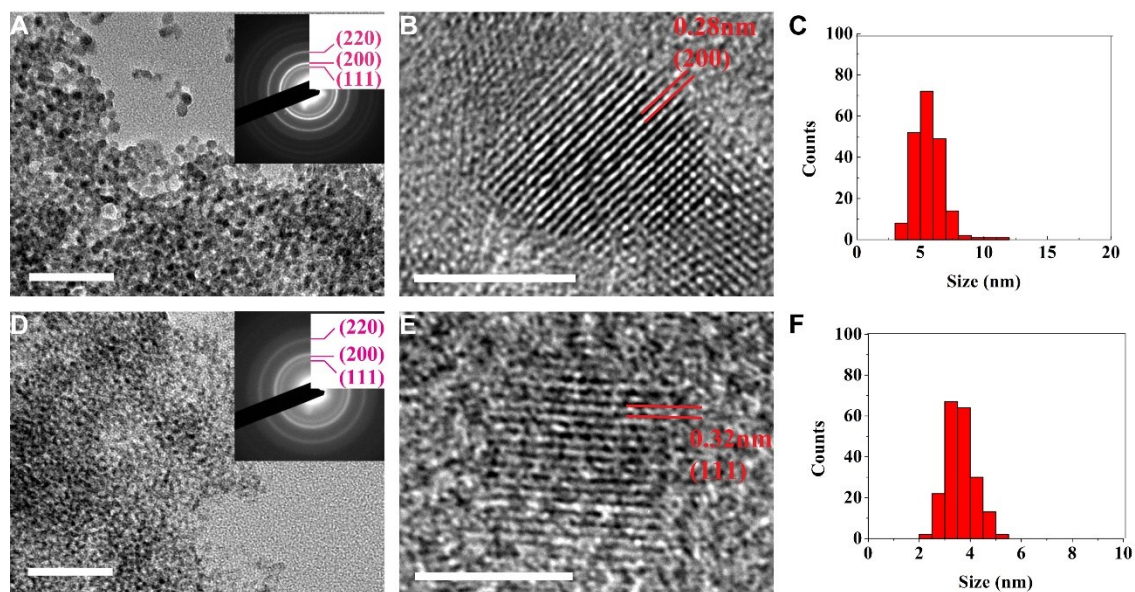
### **Facile synthesis of AgBiS<sub>2</sub> nanocrystals for high responsivity infrared detectors**

Chun Hin Mak, Jiasheng Qian, Lukas Rogée, Wai Kin Lai and Shu Ping Lau

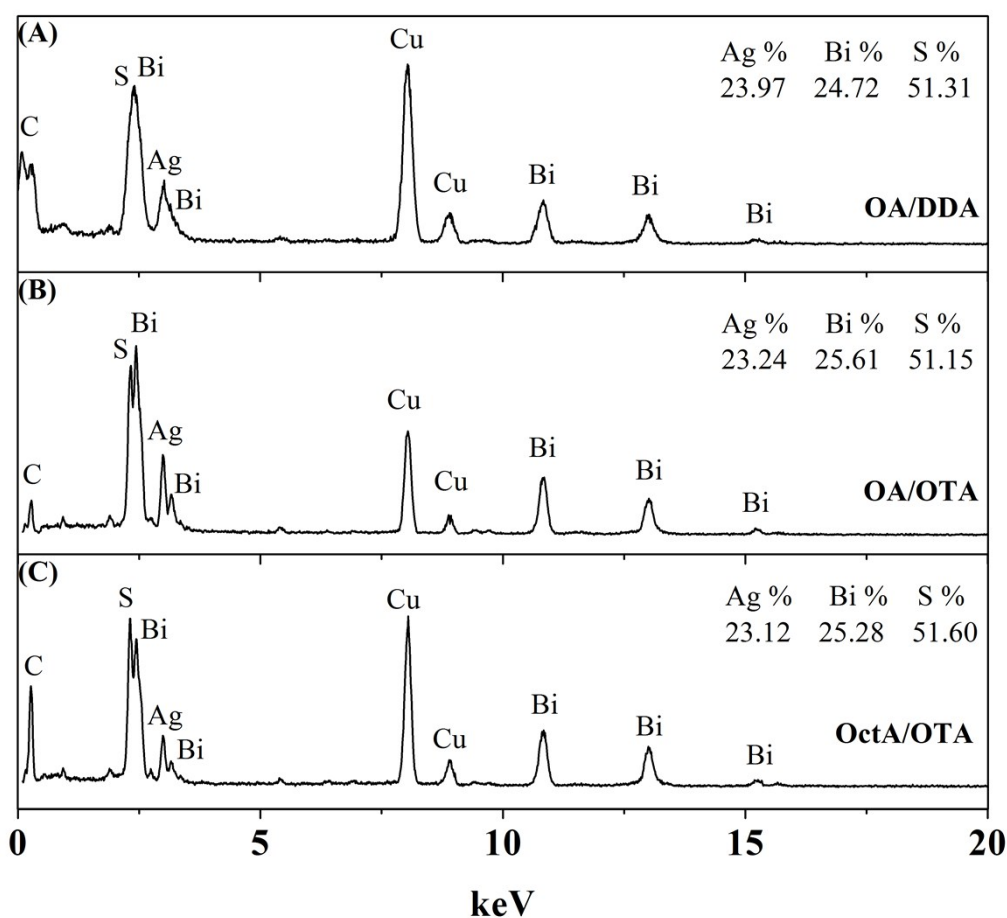
Department of Applied Physics, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR



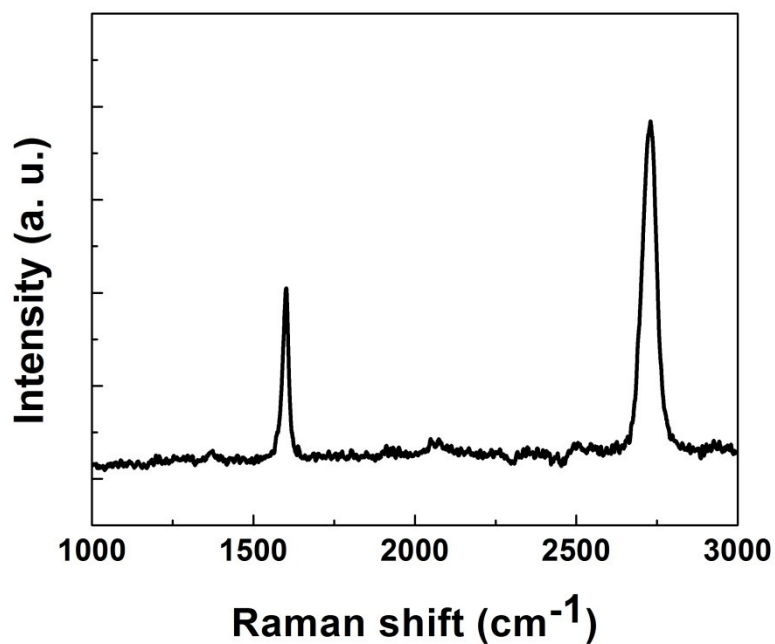
**Figure S1** XRD pattern of the AgBiS<sub>2</sub> NCs and reference pattern for cubic AgBiS<sub>2</sub> (Black lines, PDF#21-1178). The high intensity peaks (111), (200), (220) and (311) in the reference file are observed. The (111), (200), (220) are well matched with the SAED in the TEM characterization.



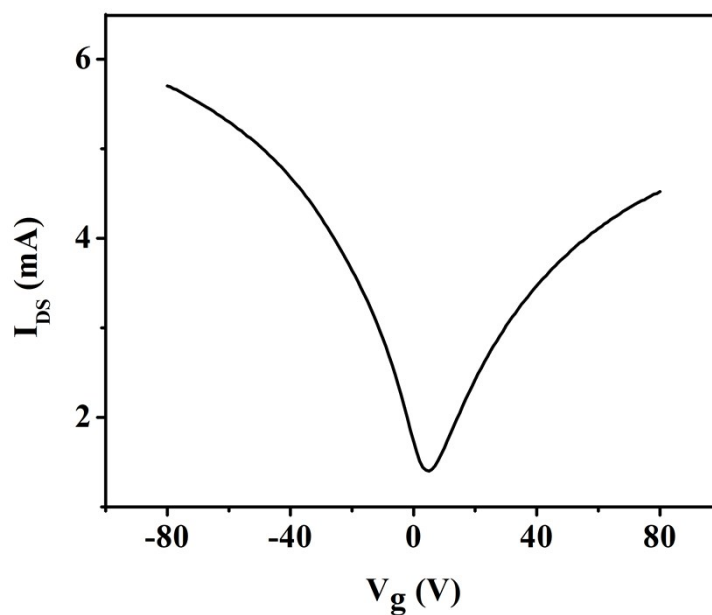
**Figure S2.** Characterizations of AgBiS<sub>2</sub> NCs synthesized by OA/OTA (A-C) and OctA/OTA (D-F). A,D) TEM images of the AgBiS<sub>2</sub> NCs. Scale bar is 50 nm. Inset: SAED pattern. B,E) High resolution TEM images of a single AgBiS<sub>2</sub> NC. Scale bar is 5 nm. C,F). Size distribution profile of the AgBiS<sub>2</sub> NCs.



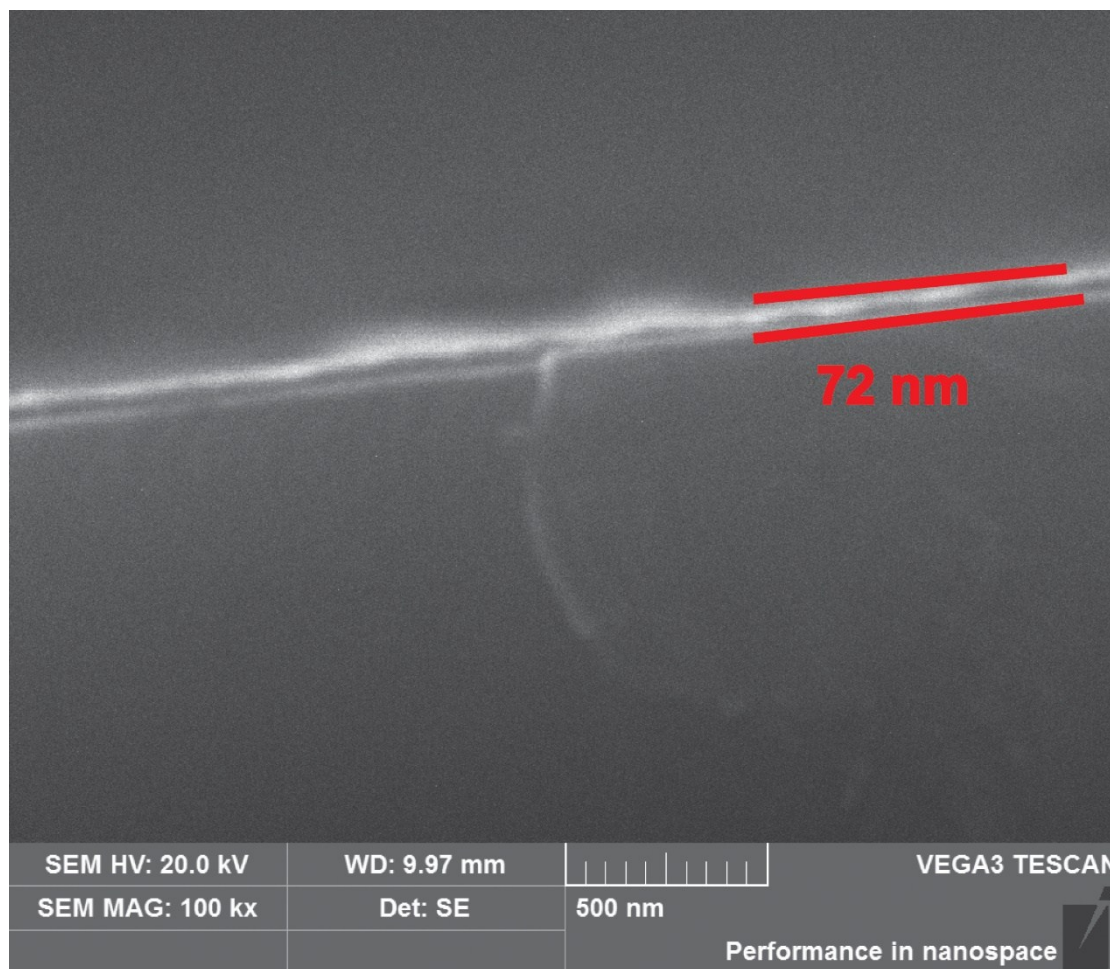
**Figure S3.** Detailed EDX spectra of the  $\text{AgBiS}_2$  NCs grown by using A) OA/DDA, B) OA/OTA, C) OctA/OTA. The EDX results confirm the elemental ratio of Ag : Bi : S are nearly 1 : 1 : 2 for all the samples. Copper and carbon signals are come from the carbon coated TEM copper grid. Oxygen is not detected in all the samples.



**Figure S4** The Raman spectrum of the graphene prepared by the chemical vapor deposition. The intensity of 2D (2693 cm<sup>-1</sup>) to G peak (1587 cm<sup>-1</sup>) ratio is about 2 which indicates the graphene is monolayer. No defect peaks are observed.



**Figure S5** Characteristic curve of the graphene transistor with  $V_{DS} = 0.1$  V in  $N_2$  environment. The Dirac point is at about 5V.



**Figure S6** Cross-sectional SEM image for the 10 layers AgBiS<sub>2</sub> NC film.