

Supplementary materials

Broadband photoluminescence of epitaxial bismuth nanowires and planar nanostructures

Andrey K. Kaveev^{1,2,*}, Vladimir V. Fedorov^{1,3}, Alexander Pavlov^{1,3}, Dmitry V. Miniv¹, Demid A. Kirilenko⁴, Dmitrii A. Pudikov⁴, Mikhail I. Vexler², Alexandr S. Goltaev¹, Sergey D. Komarov⁵, Alexey M. Nadtochiy⁵, Natalia V. Kryzhanovskaya⁵ and Ivan S. Mukhin^{1,3}

¹ Alferov University, St. Petersburg, 195220, Russian Federation

² Ioffe Institute, St. Petersburg, 194021, Russian Federation

³ Peter the Great St. Petersburg Polytechnic University, St. Petersburg, 195251, Russian Federation

⁴ St. Petersburg State University, St. Petersburg, 199034, Russian Federation

⁵ HSE University, St. Petersburg, 194000, Russian Federation

*Correspondence email: kaveevandrei@yandex.ru

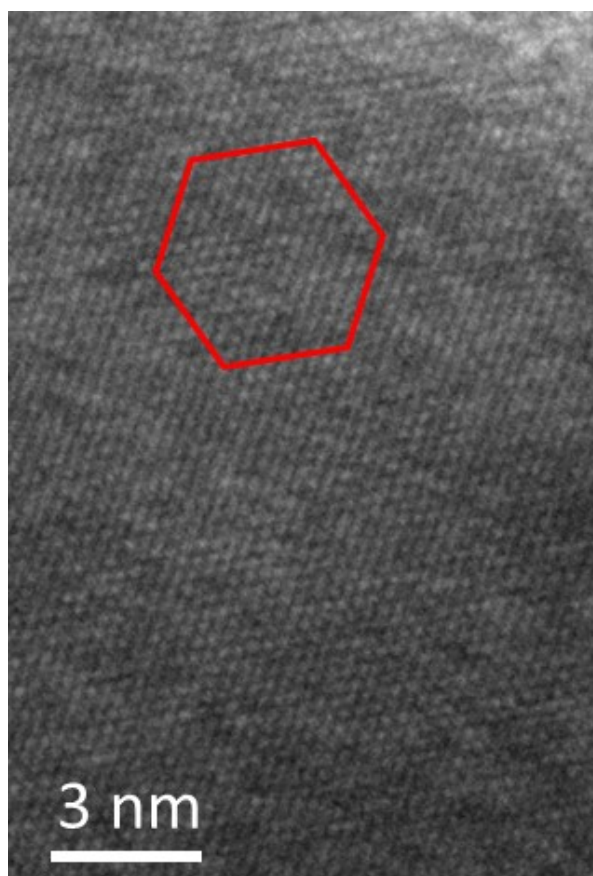


Fig. S1. HRTEM image of Bi nanowire confirming their defect-free nature. The red line shows the corresponding $\langle 110 \rangle$ crystalline directions.

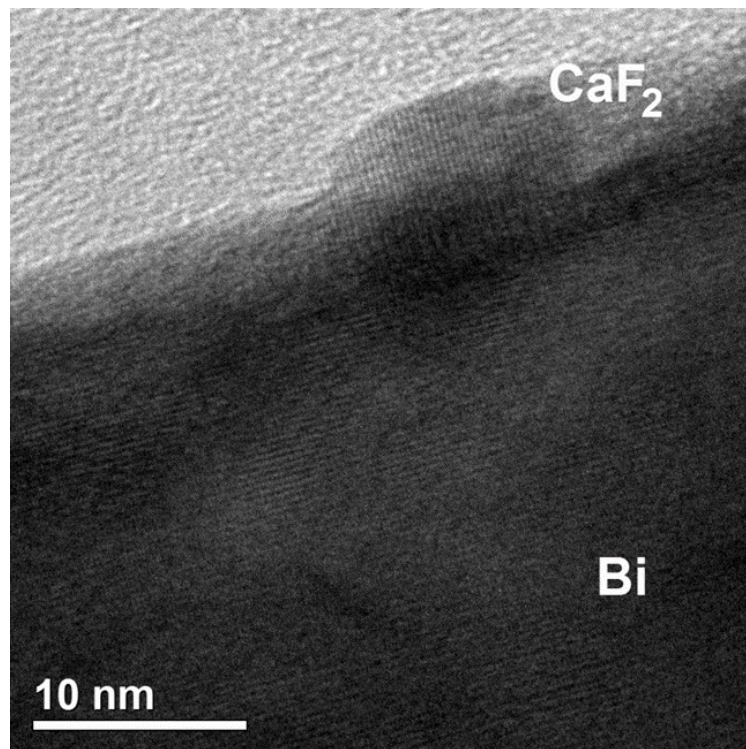


Fig. S2. HRTEM image of Bi nanowires with a CaF₂ protective layer.

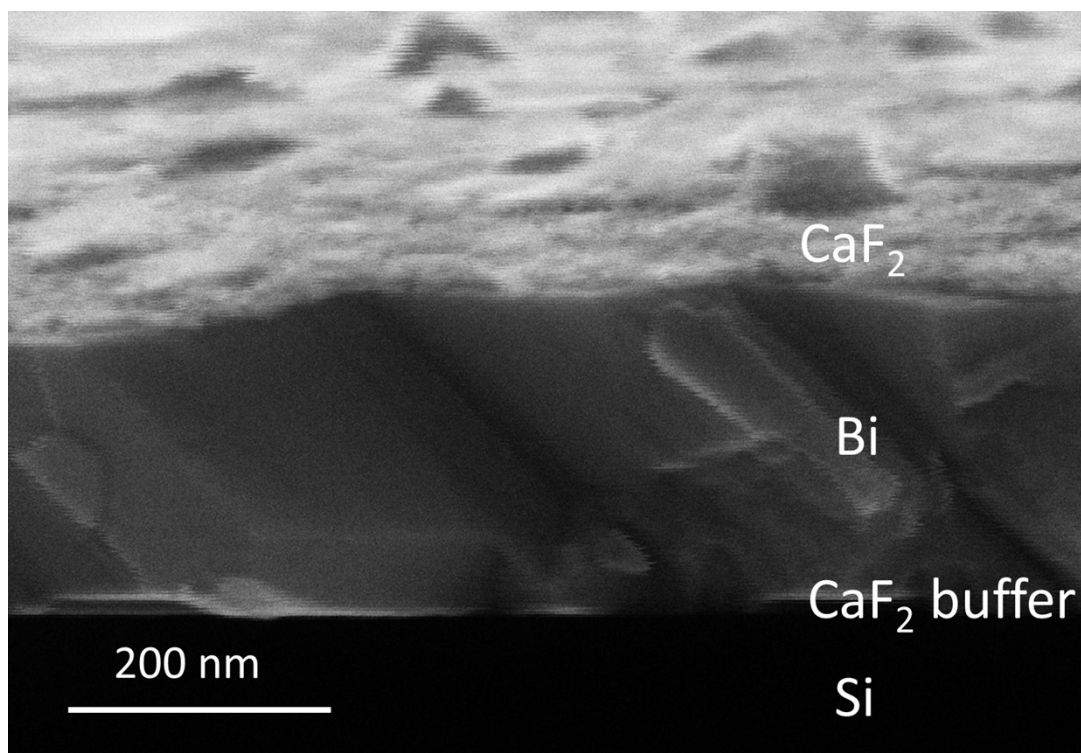


Fig. S3. Cross-sectional SEM image of sandwiched CaF₂ capping layer/ Bi /CaF₂ buffer / Si.

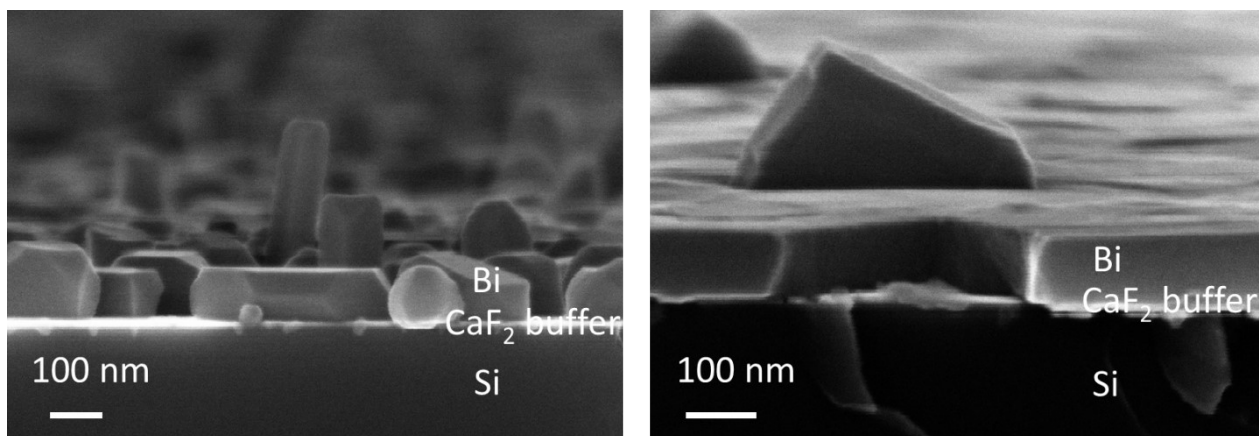


Fig. S4. Cross-sectional SEM images of sandwiched Bi / CaF₂ buffer / Si layers (with different morphology, namely islands, nanowires and planar film).

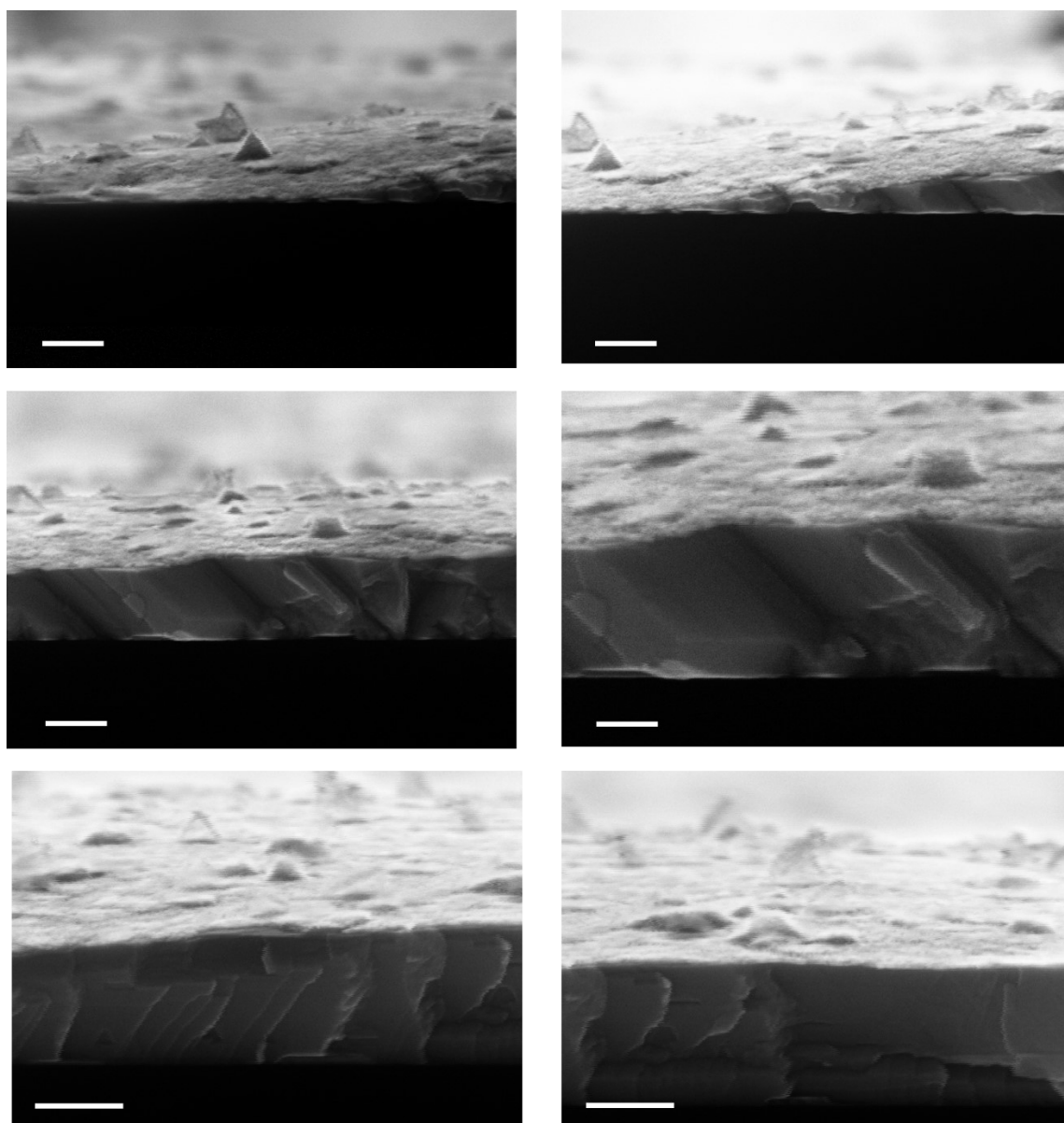


Fig. S5. Cross-sectional SEM images of CaF₂ layer covering Bi islands. Scale bar is 200 nm.

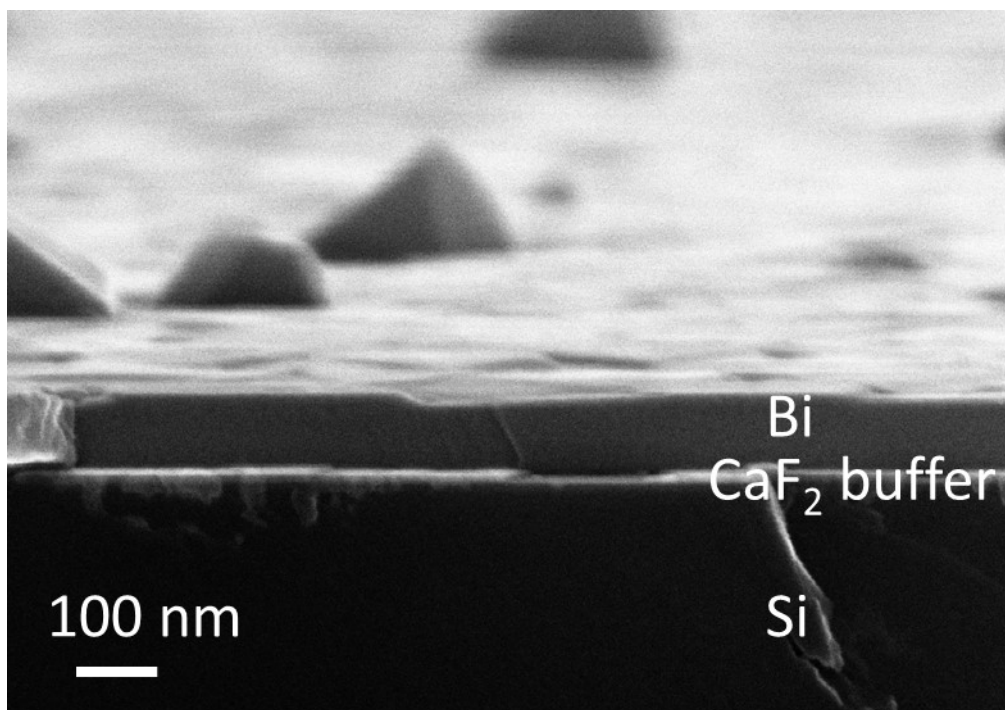


Fig. S6. Typical cross-sectional SEM image of Bi layer/ CaF₂ buffer /Si

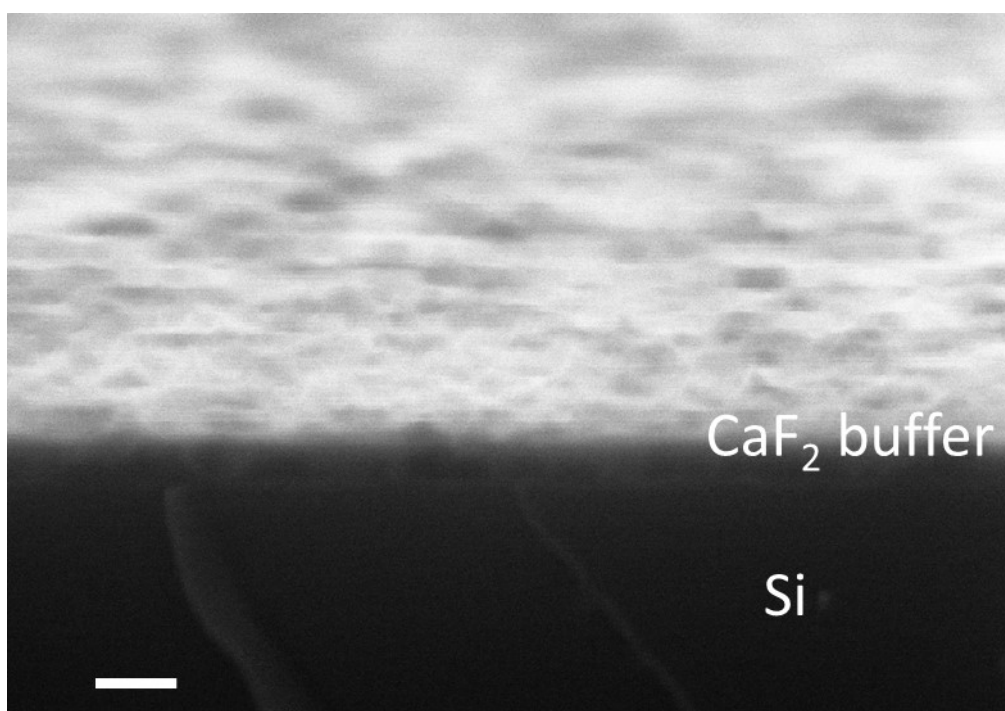


Fig. S7. Typical cross-sectional SEM image of a CaF₂ film grown at the same conditions as a CaF₂ buffer layer. A scale bar is 50 nm.

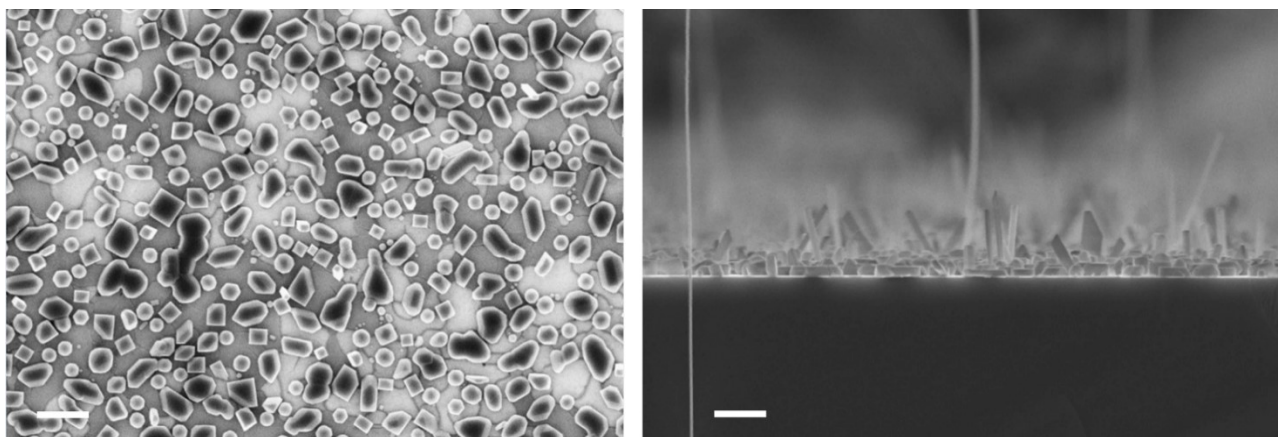


Fig. S8. Typical cross-sectional SEM image of a Bi nanoarray grown at the temperature of 125 °C containing as islands, so short and elongated nanowires.

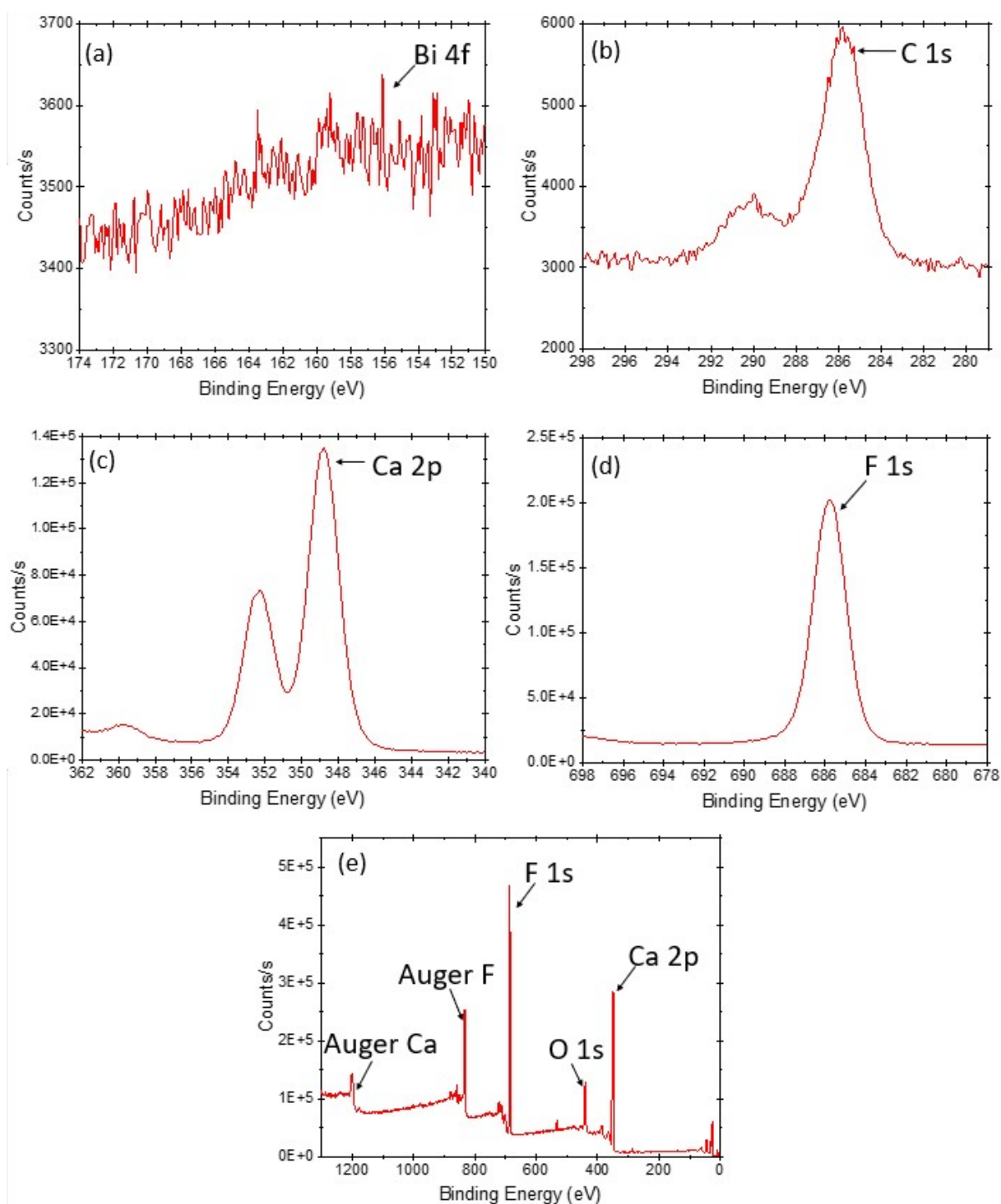


Fig. S9. High-resolution XPS spectra of (a) Bi 4f, (b) C 1s, (c) Ca 2p, (d) F 1s peaks and (e) XPS survey spectrum.