Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

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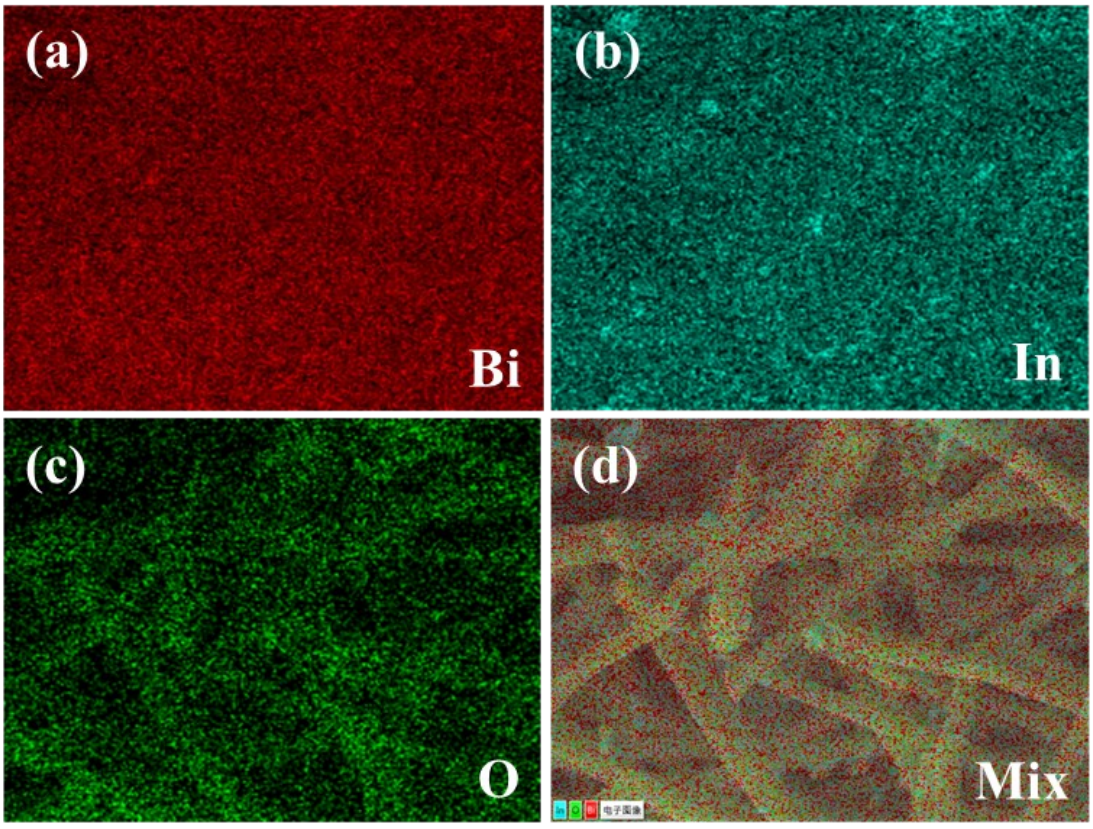

Fig. S1. the corresponding EDS mappings of (a) Bi, (b) In, (C) O, and (d) Mix for Bi_5In_5 oxide precursor NFs.

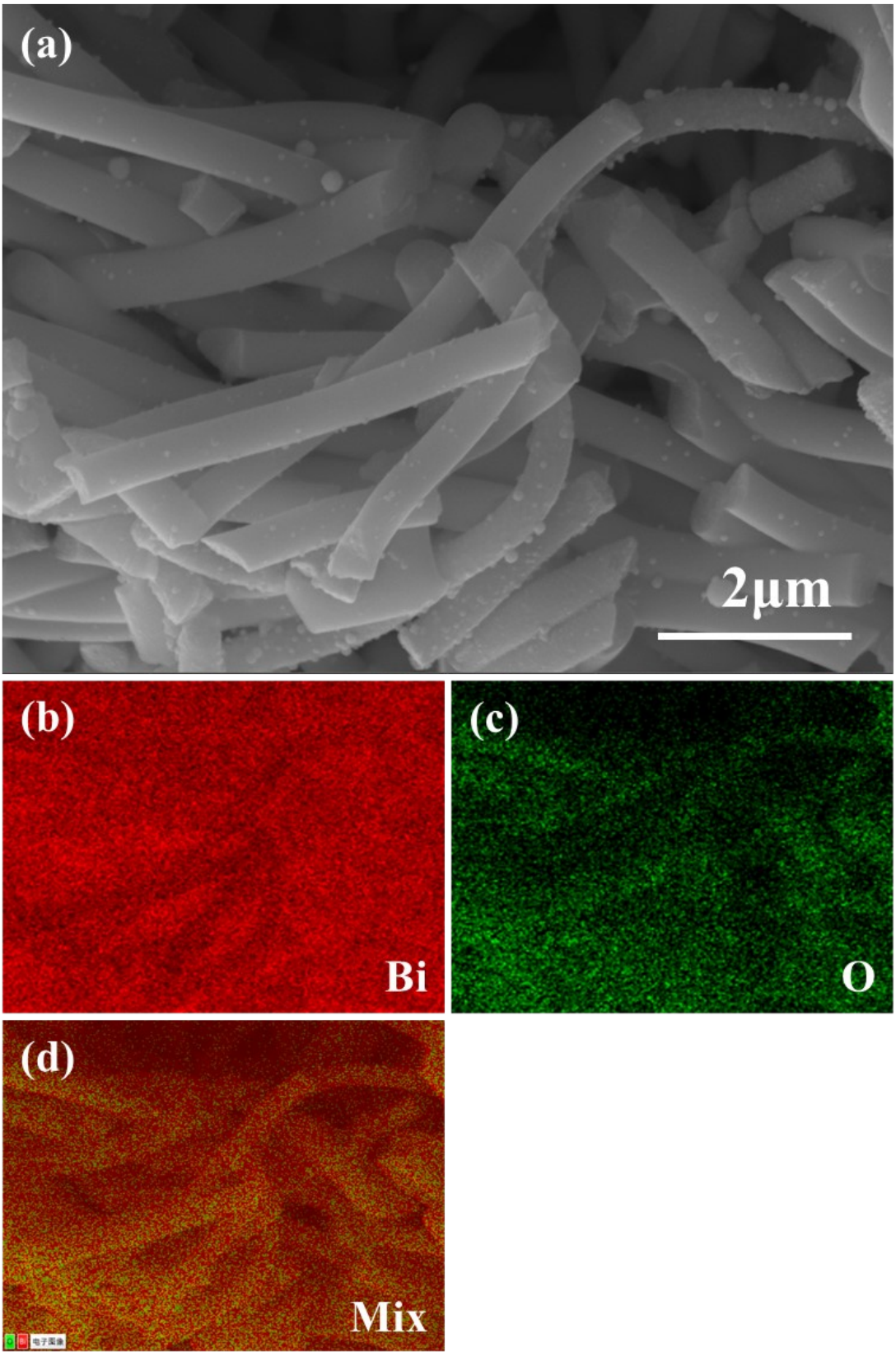

Fig. S2. (a) SEM image and (b, c, and d) the corresponding EDS mappings of the Bi oxide precursor NFs.

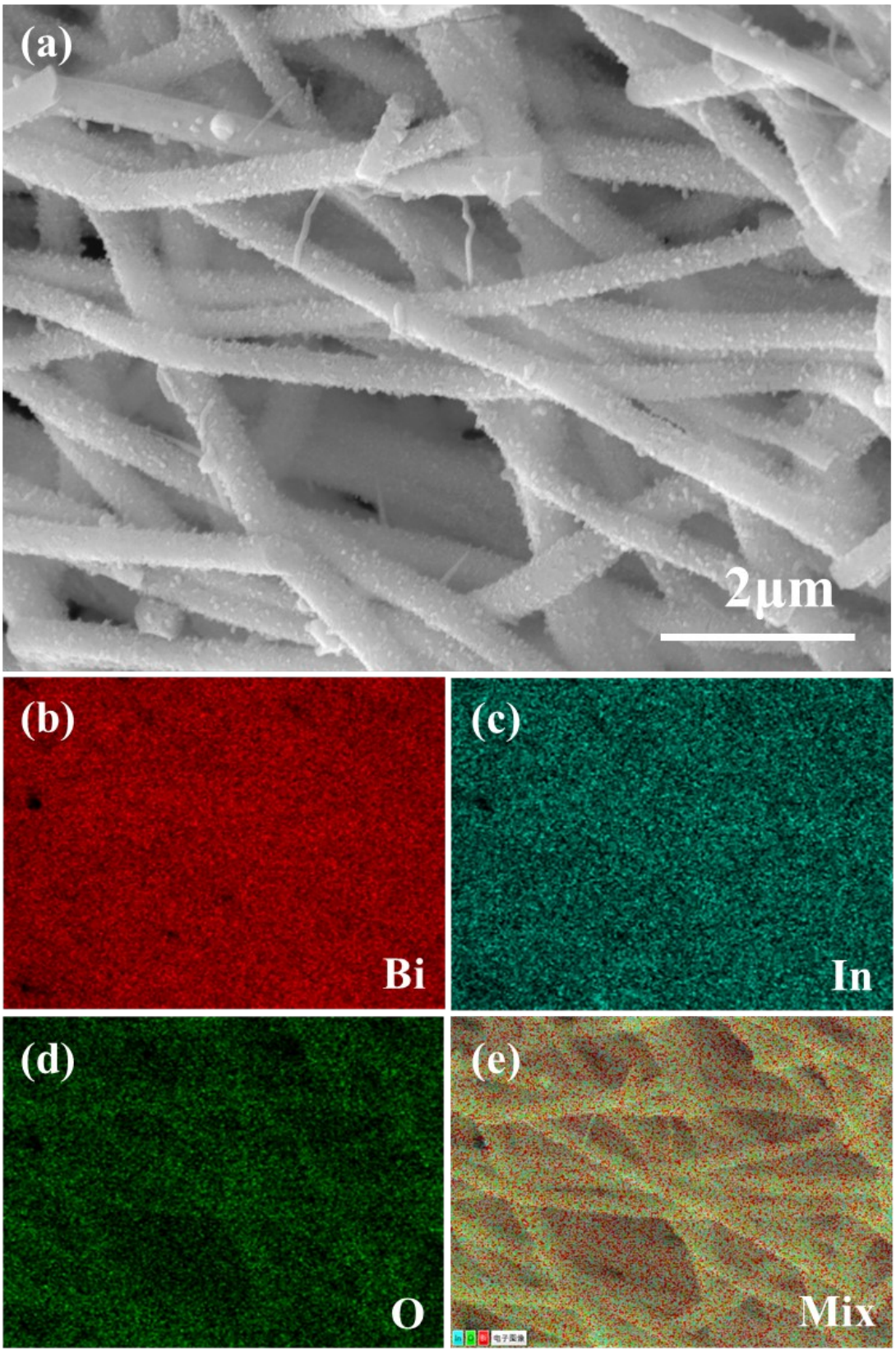

Fig. S3. (a) SEM image and (b, c, d and e) the corresponding EDS mappings of the Bi_7In_3 oxide precursor NFs.

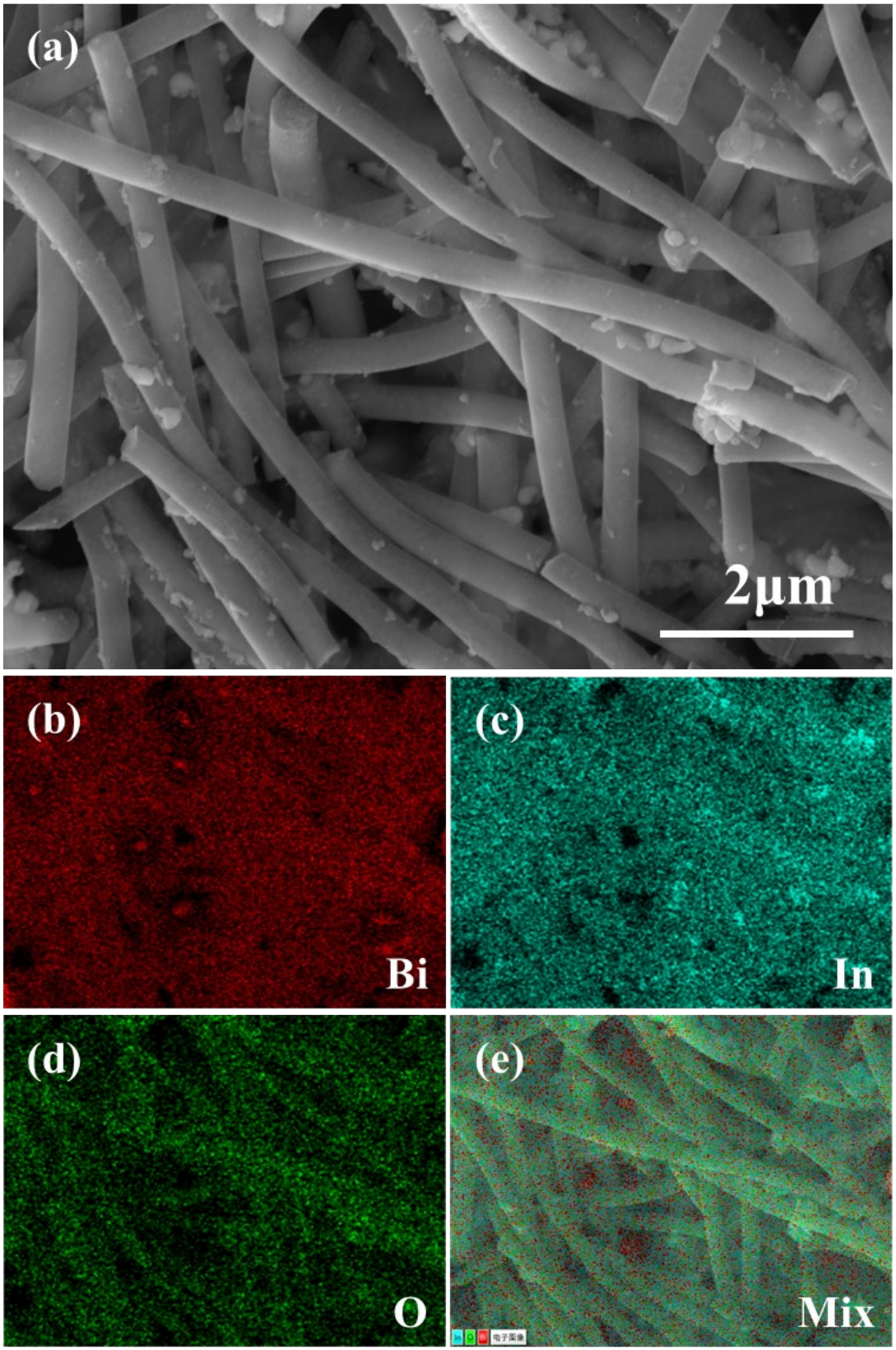

Fig. S4. (a) SEM image and (b, c, d and e) the corresponding EDS mappings of the Bi_3In_7 oxide precursor NFs.

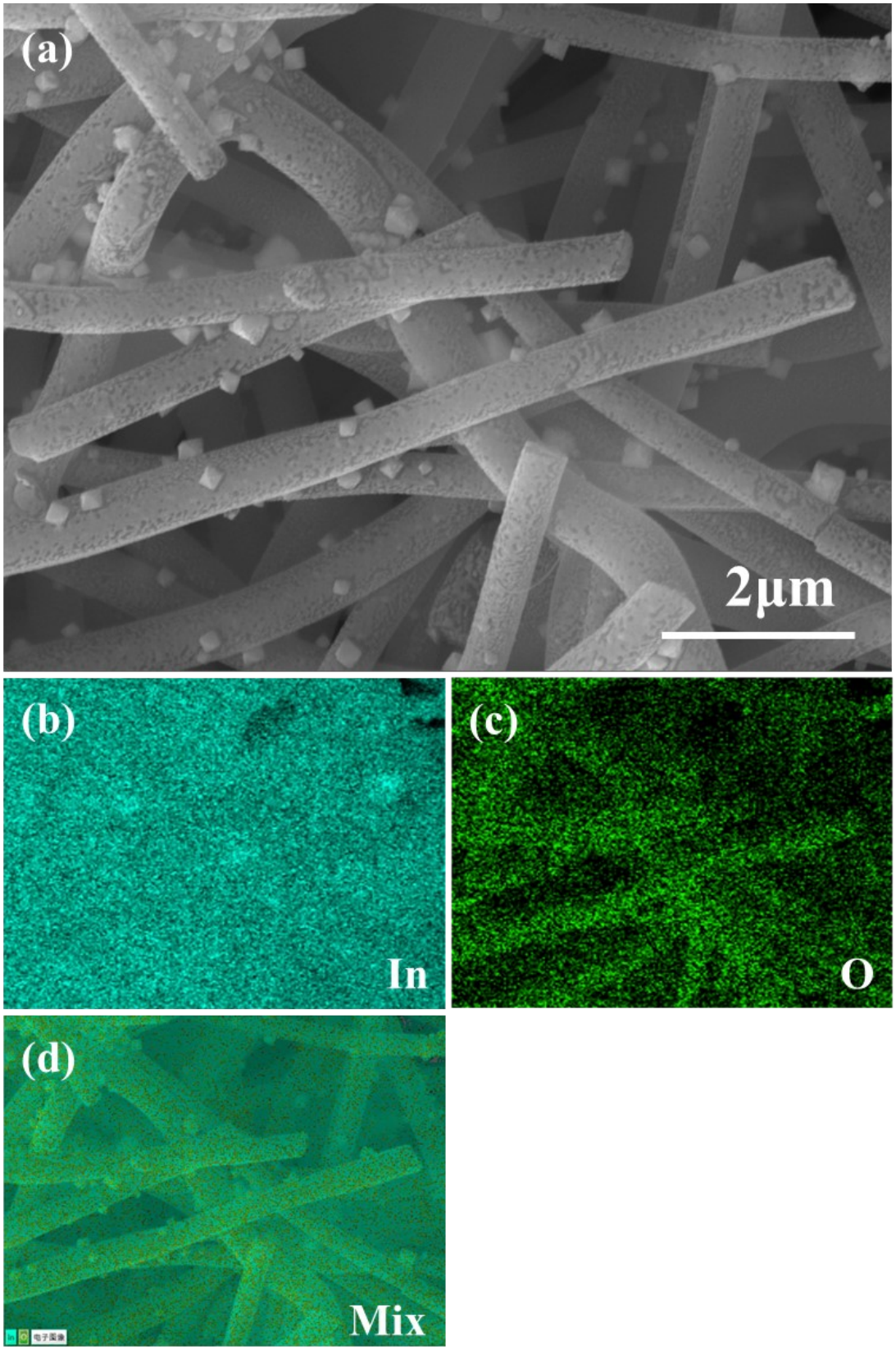

Fig. S5. (a) SEM image and (b, c, and d) the corresponding EDS mappings of the In oxide precursor NFs.

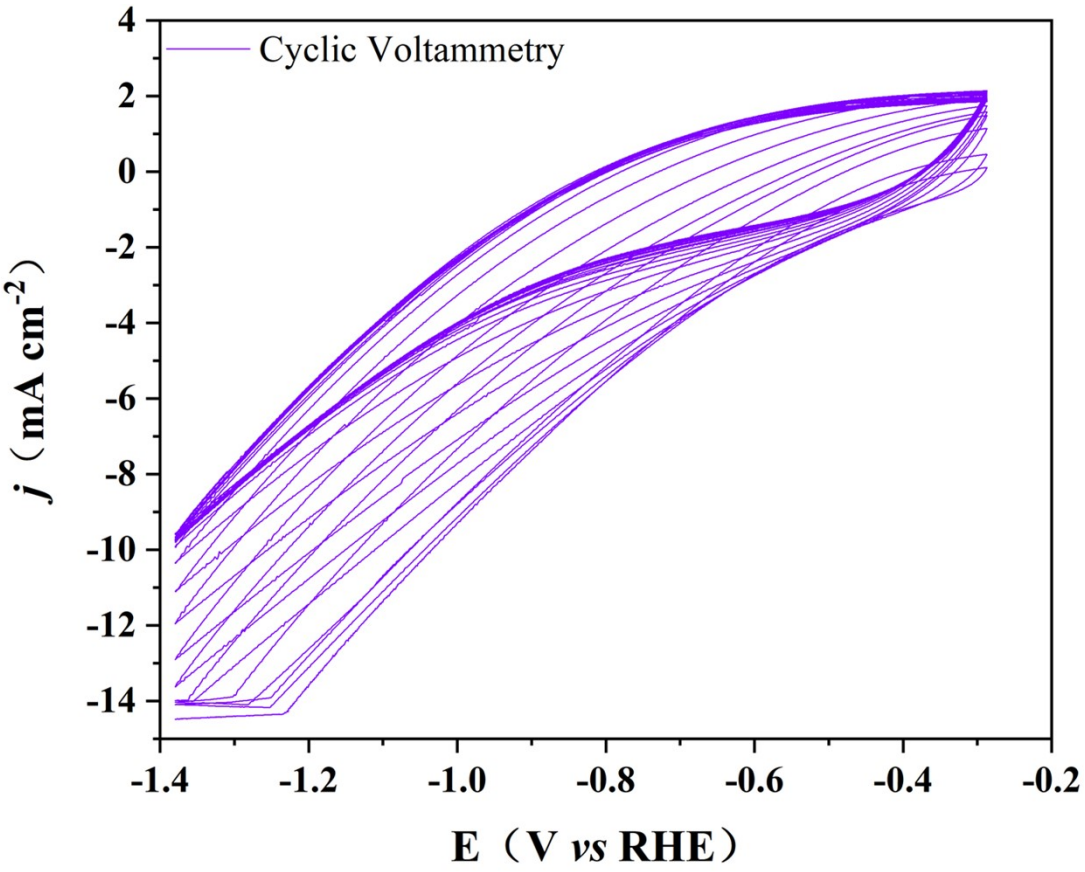

Fig. S6. the electrochemical reducing current-voltage curve.

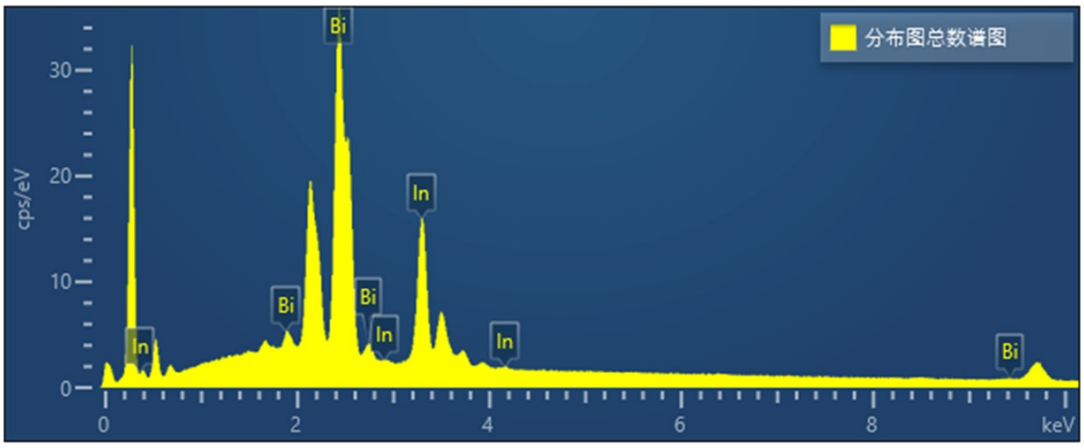

Fig. S7. EDS of Bi5In5 NFs.

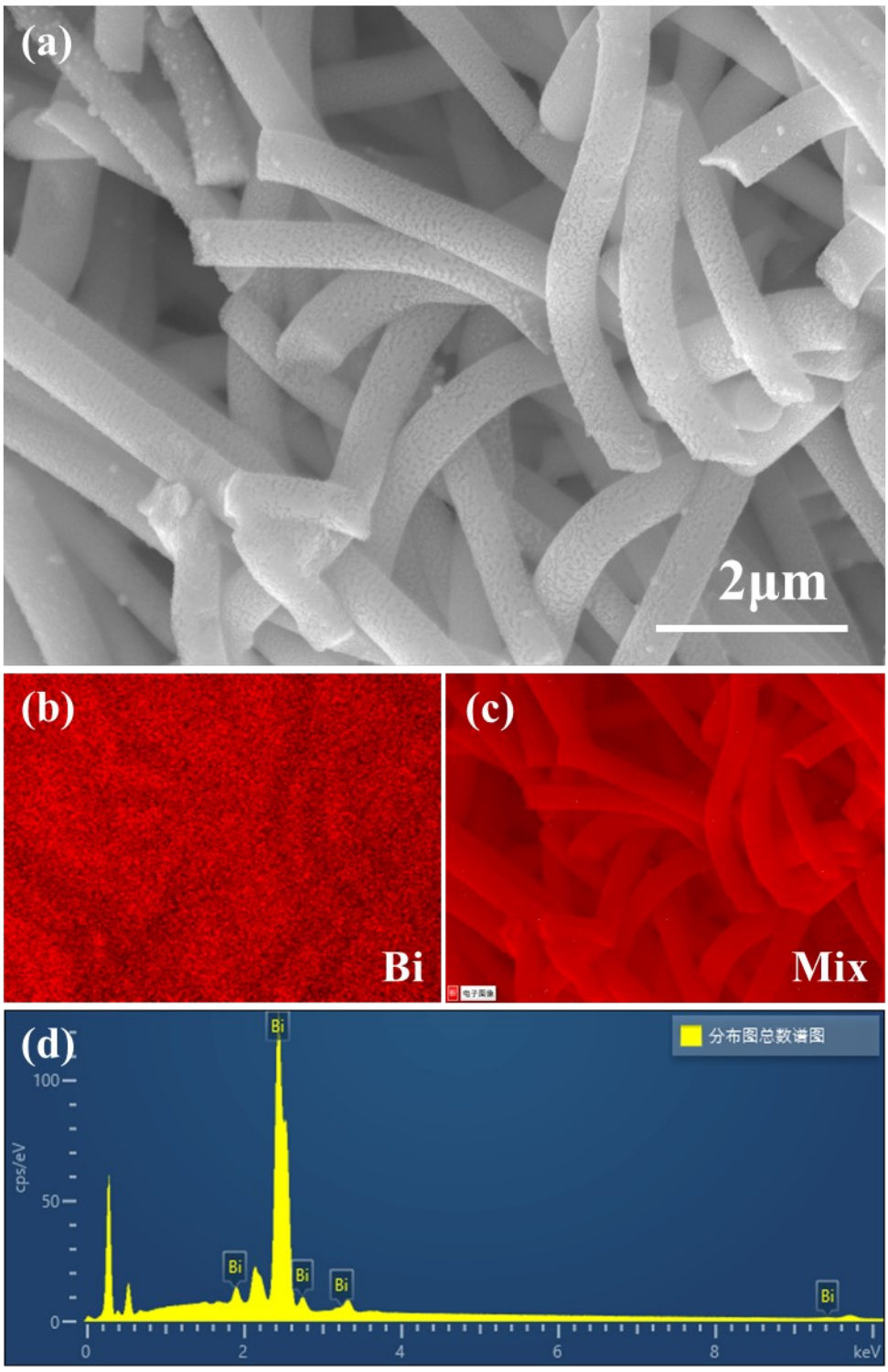

Fig. S8. (a) SEM image and (b, c, and d) the corresponding EDS and mappings of the Bi NFs.

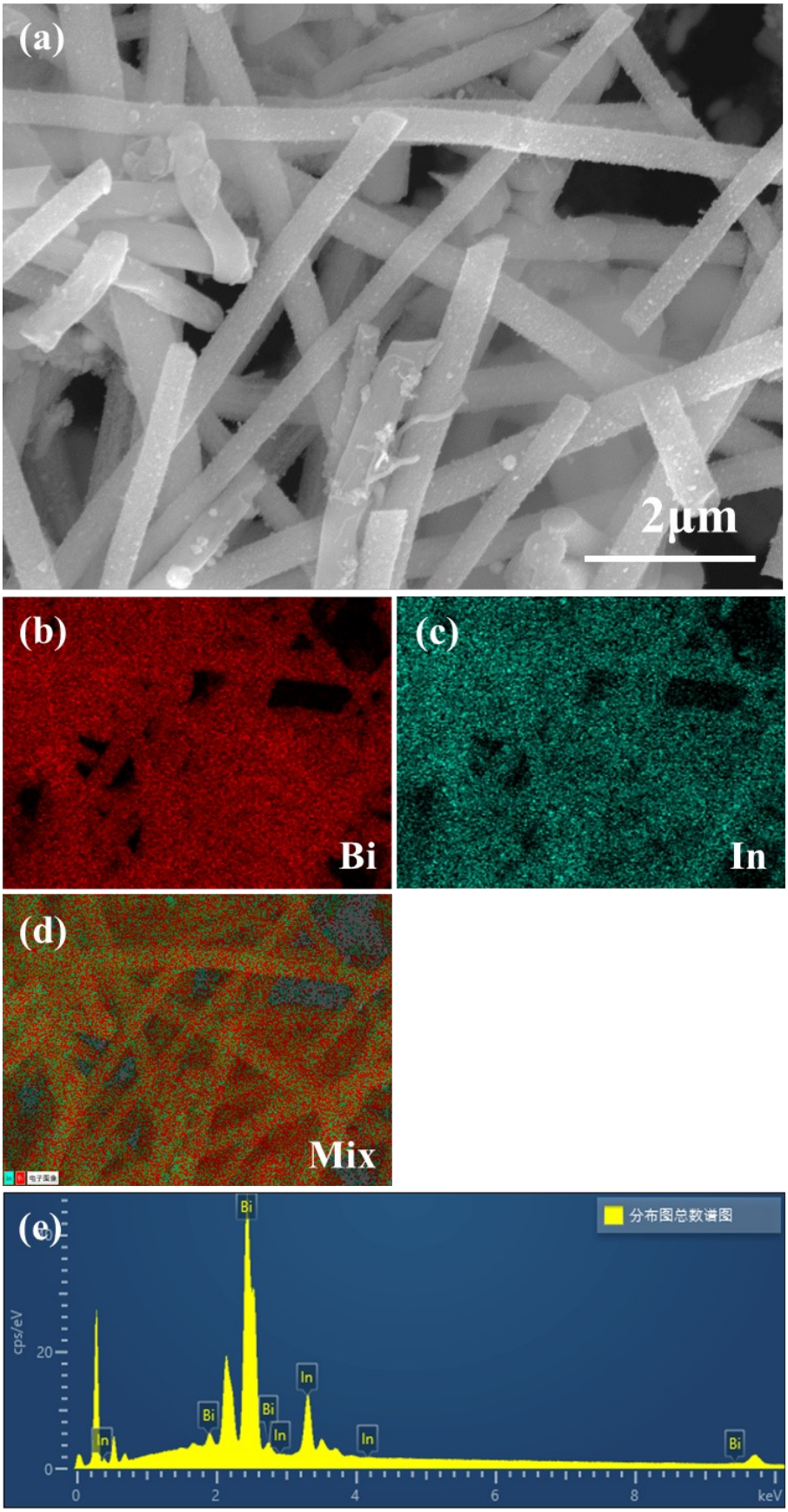

Fig. S9. (a) SEM image and (b, c, d and e) the corresponding EDS and mappings of the Bi_7In_3 NFs.

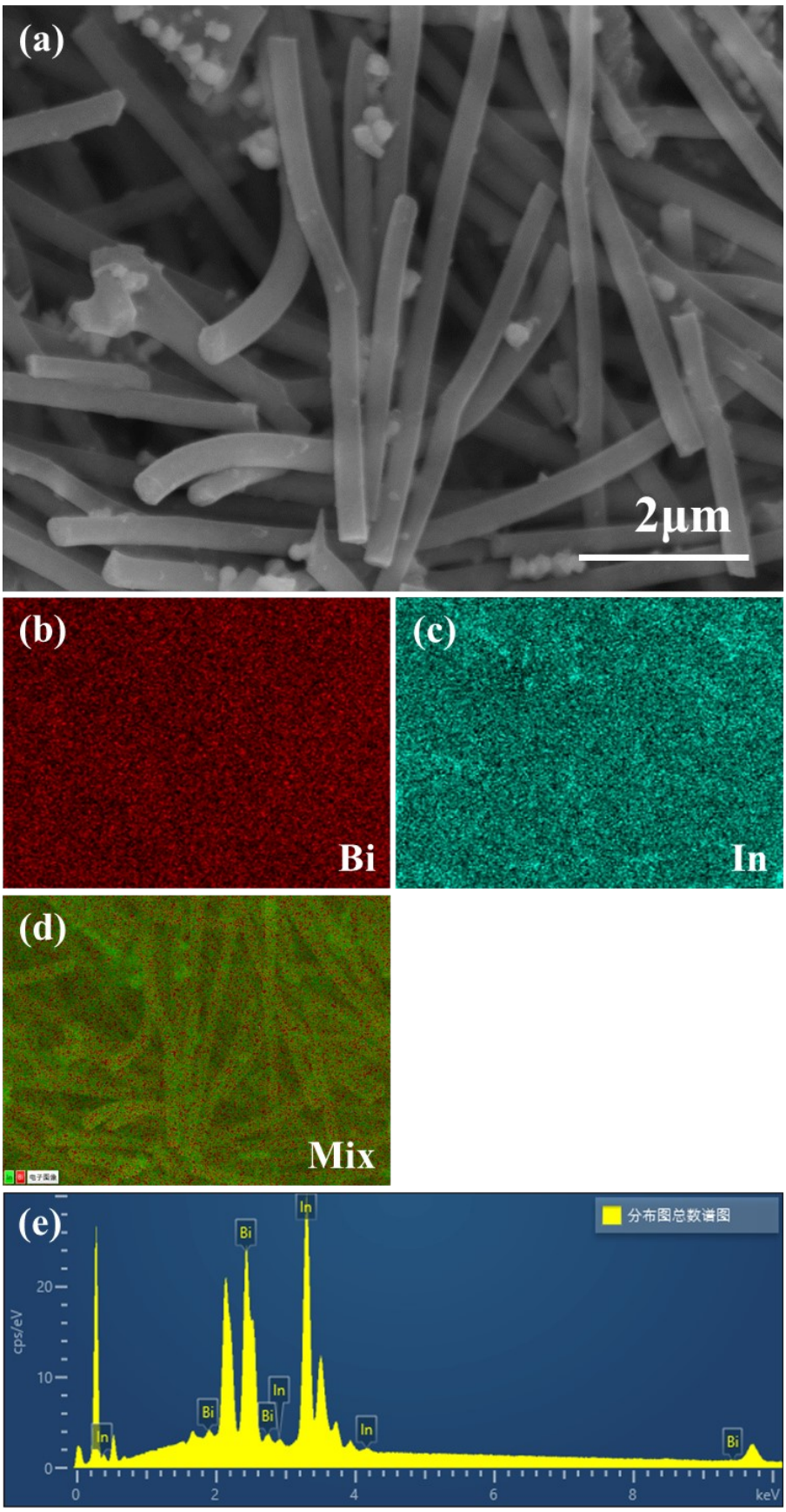

Fig. S10. (a) SEM image and (b, c, d and e) the corresponding EDS and mappings of the Bi_3In_7 NFs.

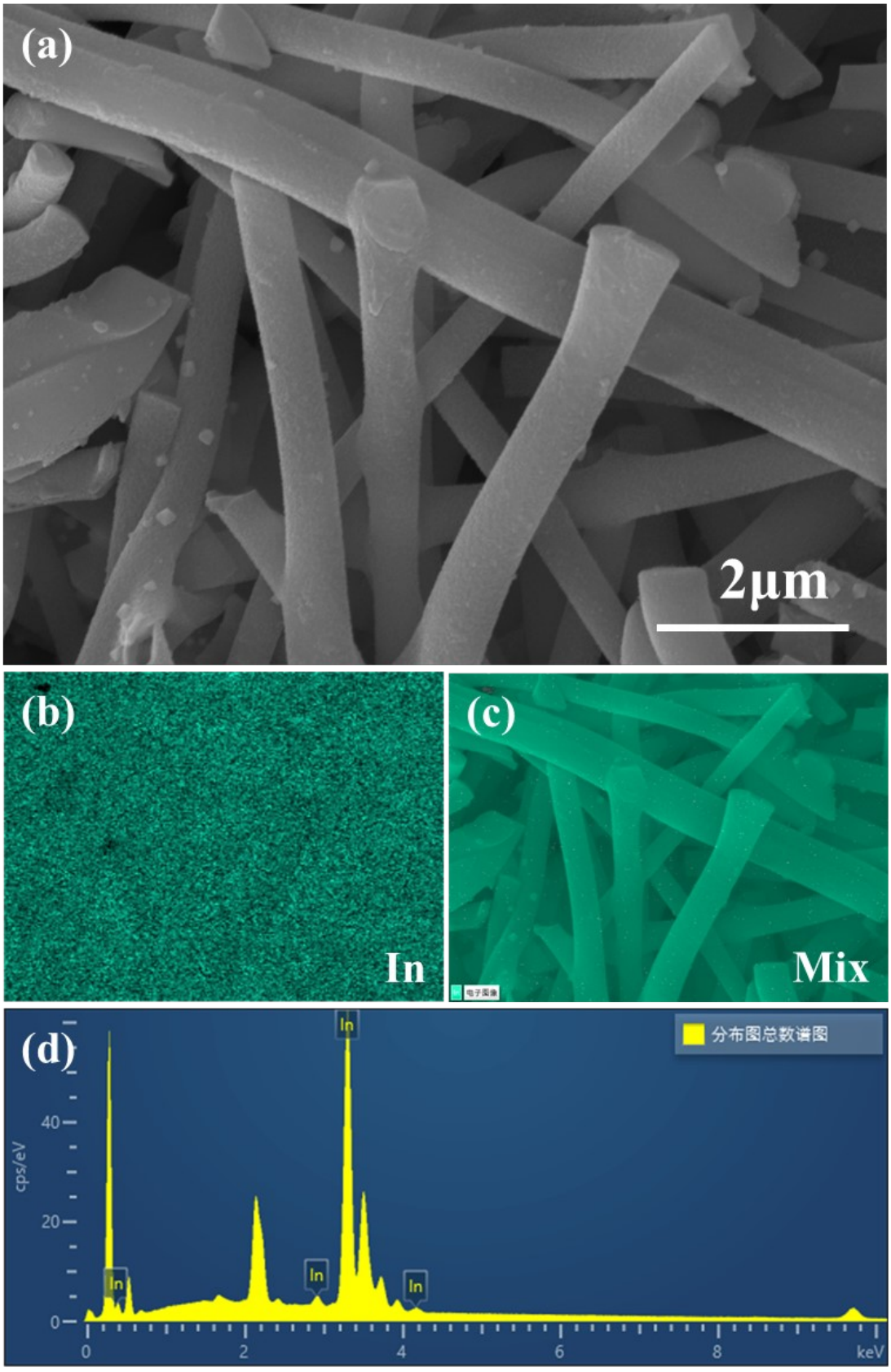

Fig. S11. (a) SEM image and (b, c, d and e) the corresponding EDS and mappings of the Bi_3In_7 NFs.

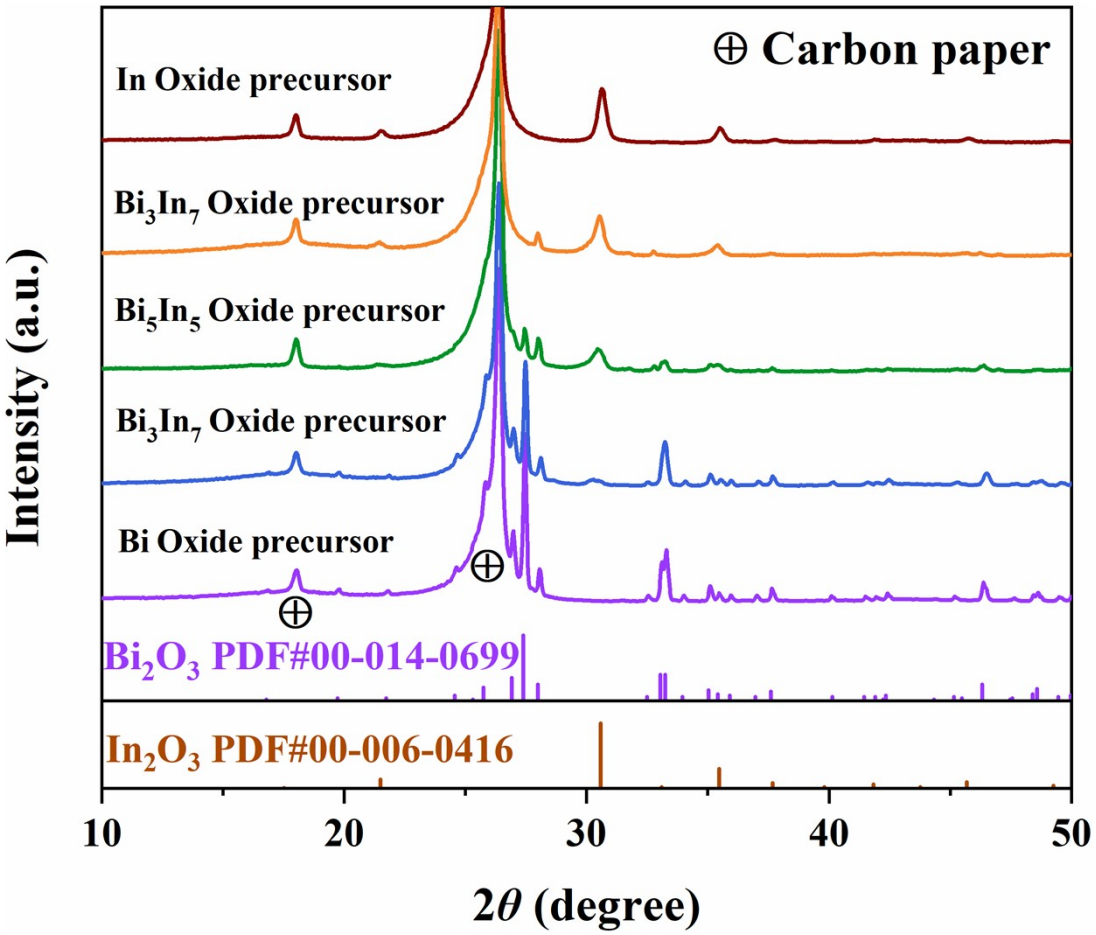

Fig. S12. XRD patterns of the oxide precursor NFs.

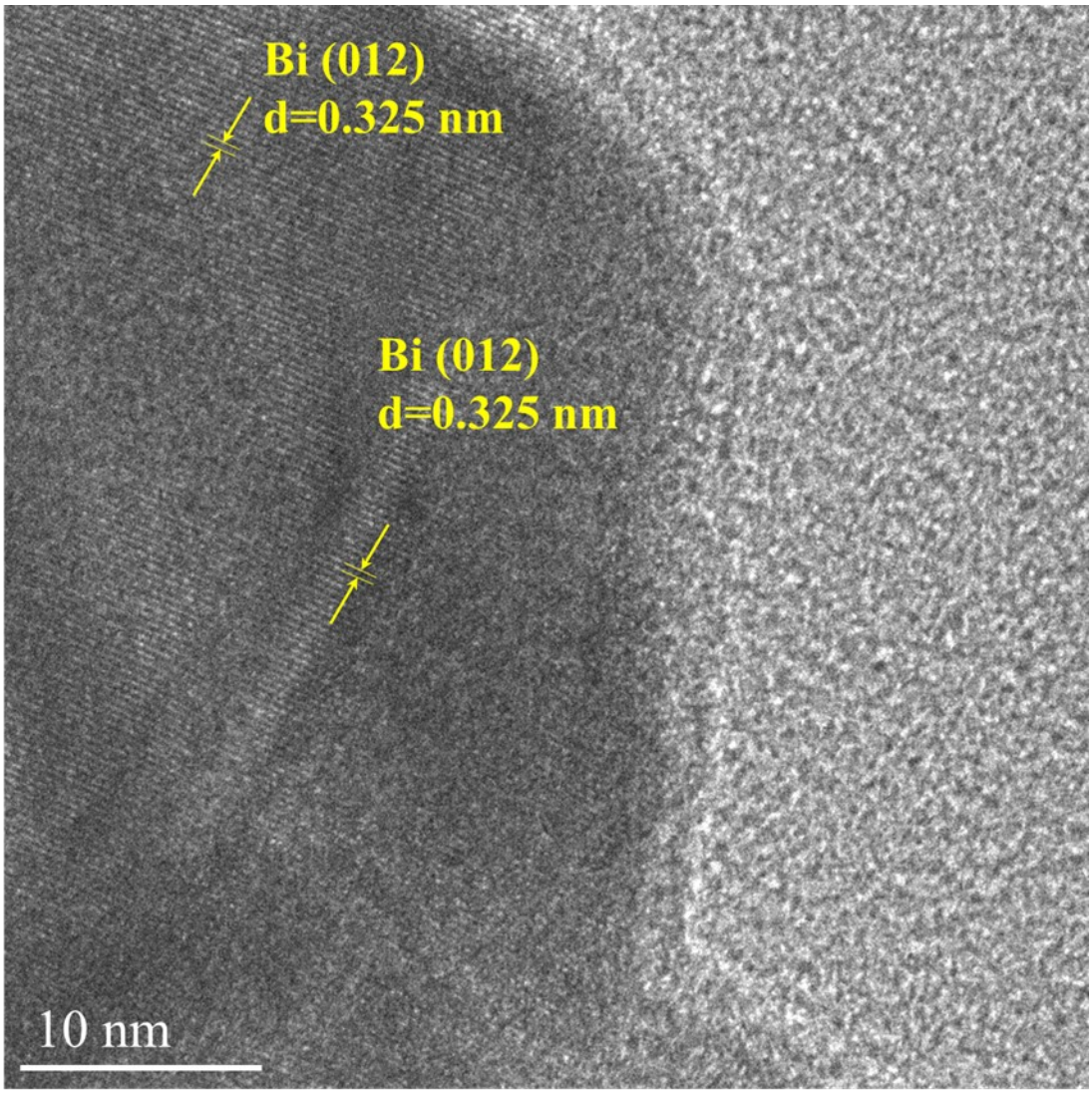

Fig. S13. HRTEM of Bi.

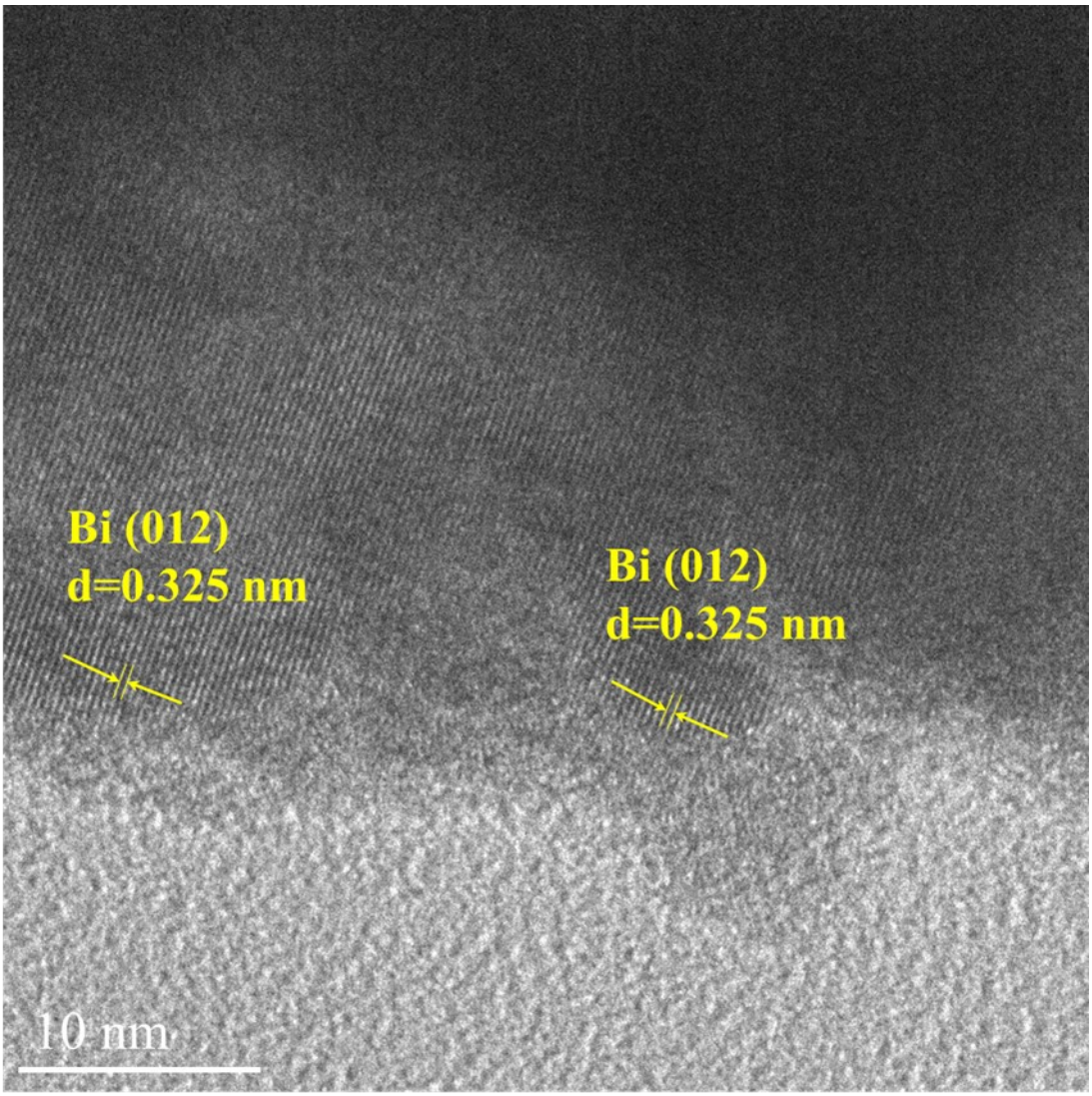

Fig. S14. HRTEM of Bi_7In_3.

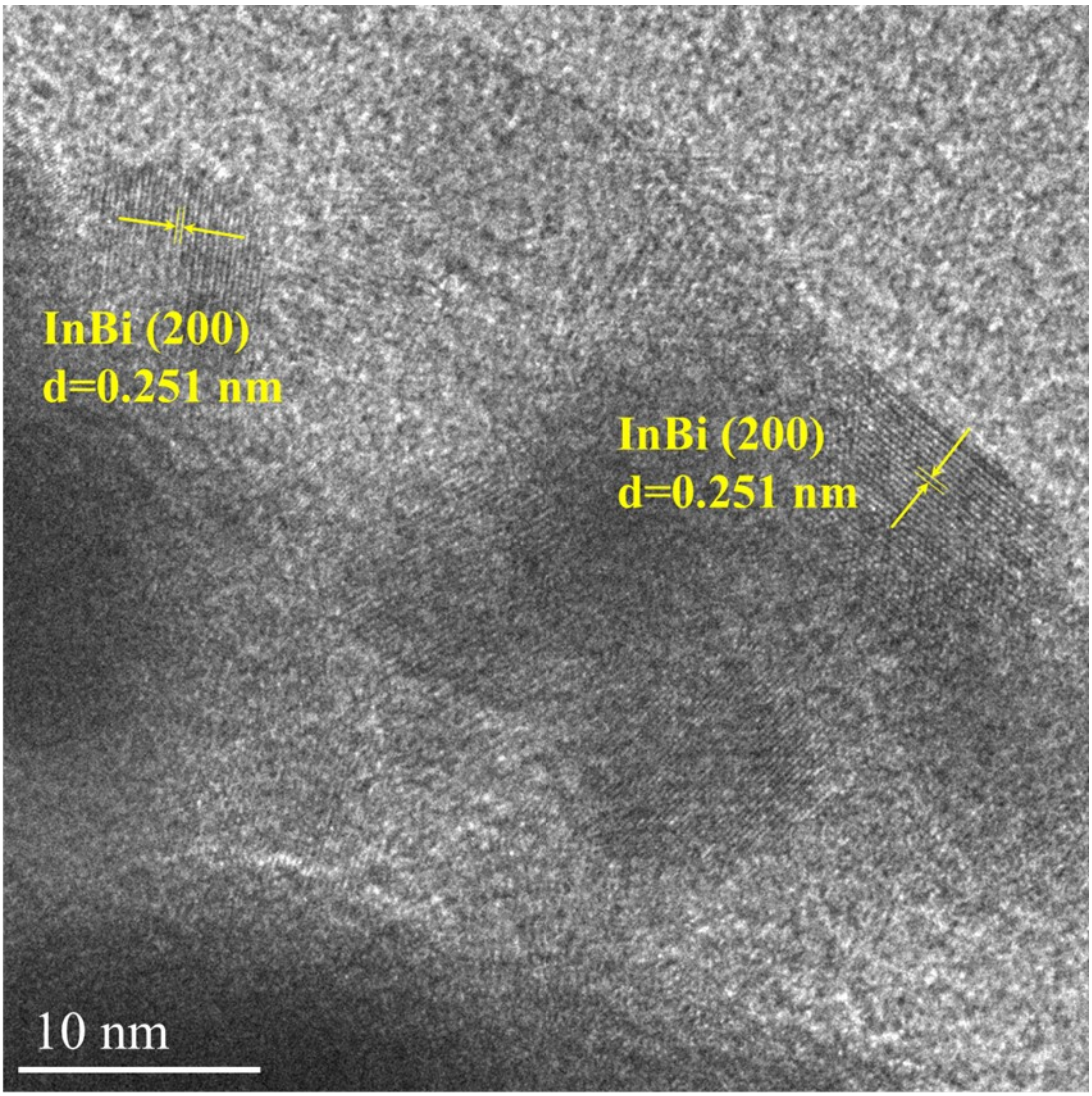

Fig. S15. HRTEM of Bi_5In_5.

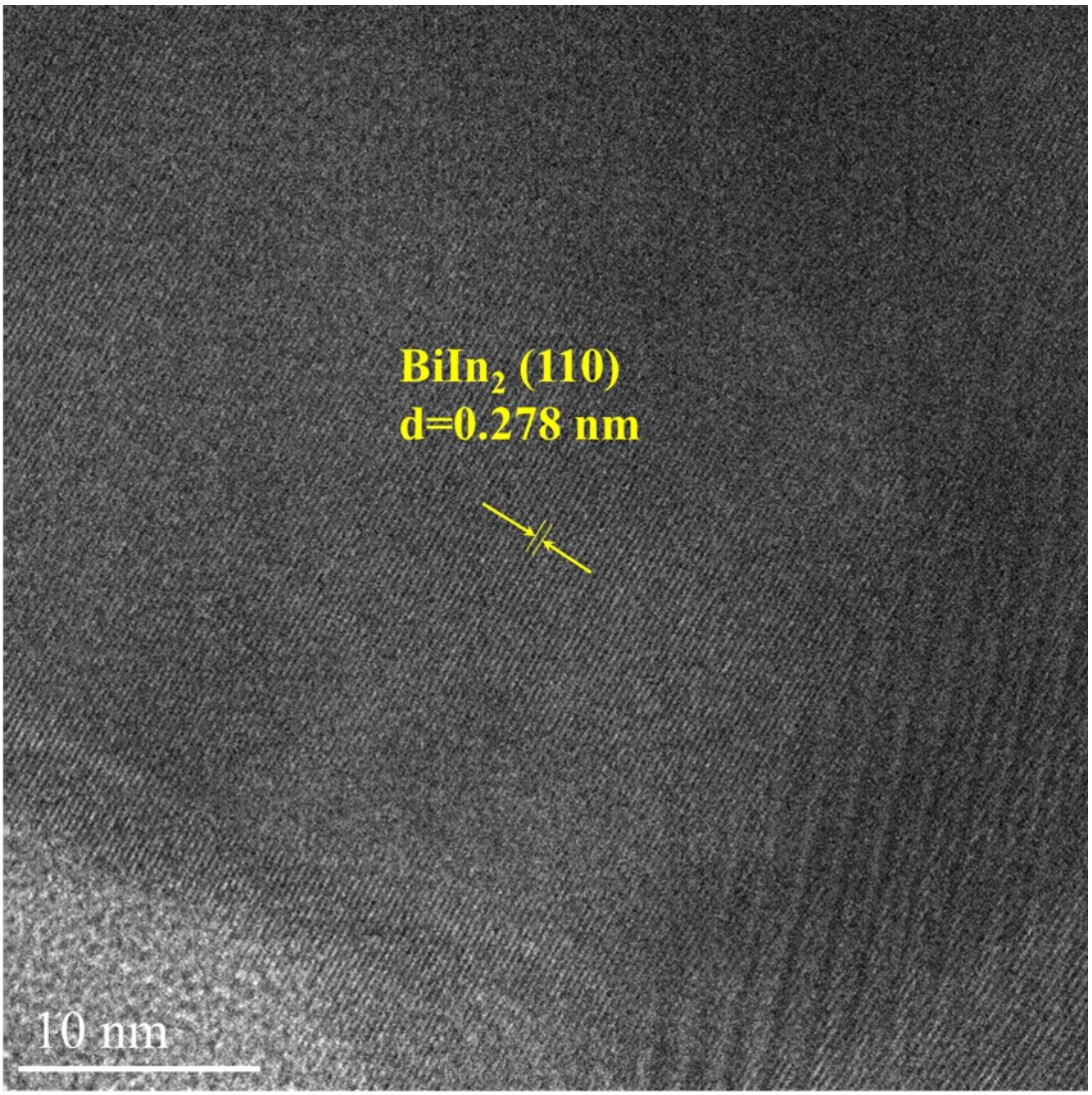

Fig. S16. HRTEM of Bi_3In_7.

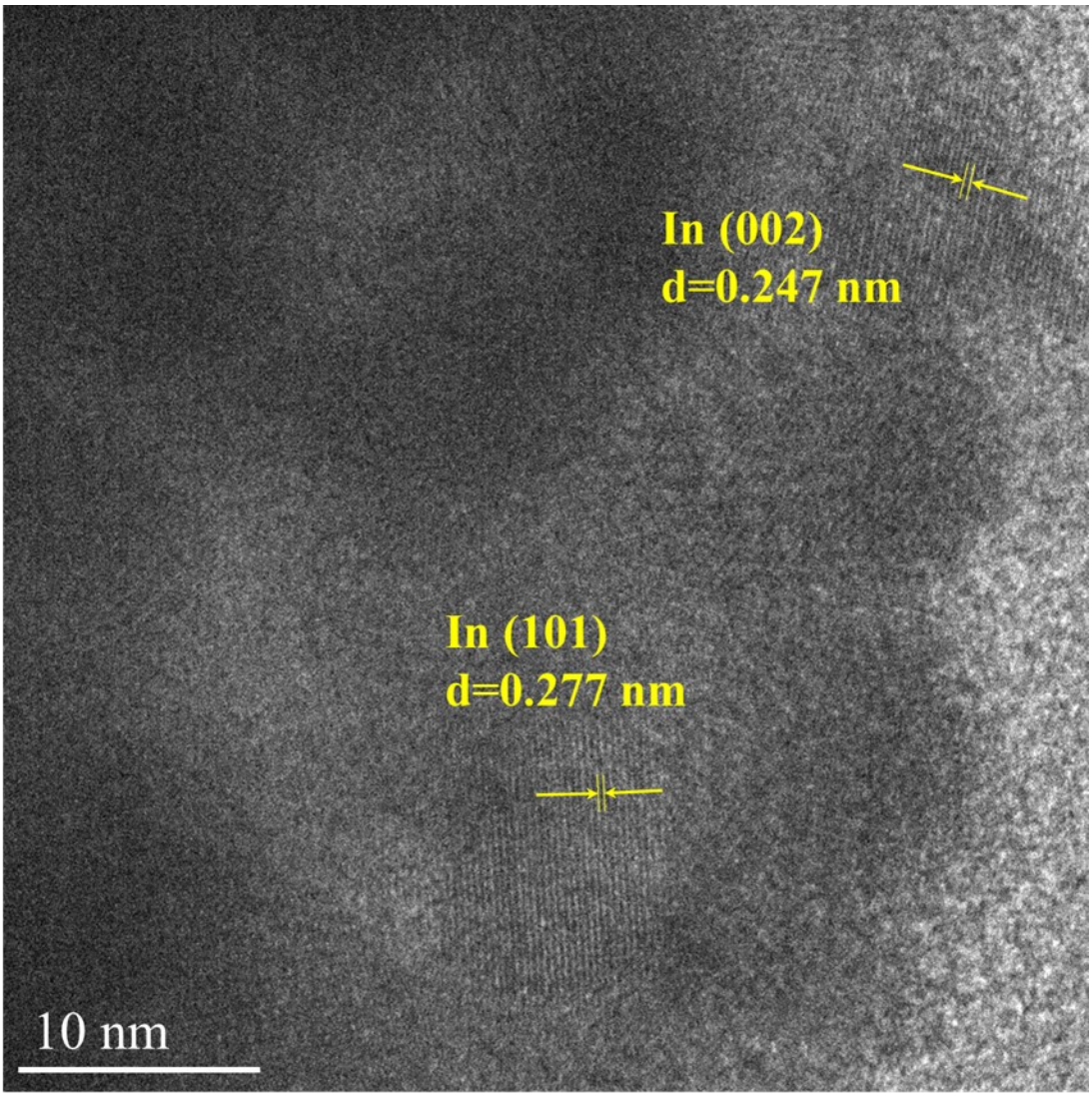

Fig. S17. HRTEM of In.

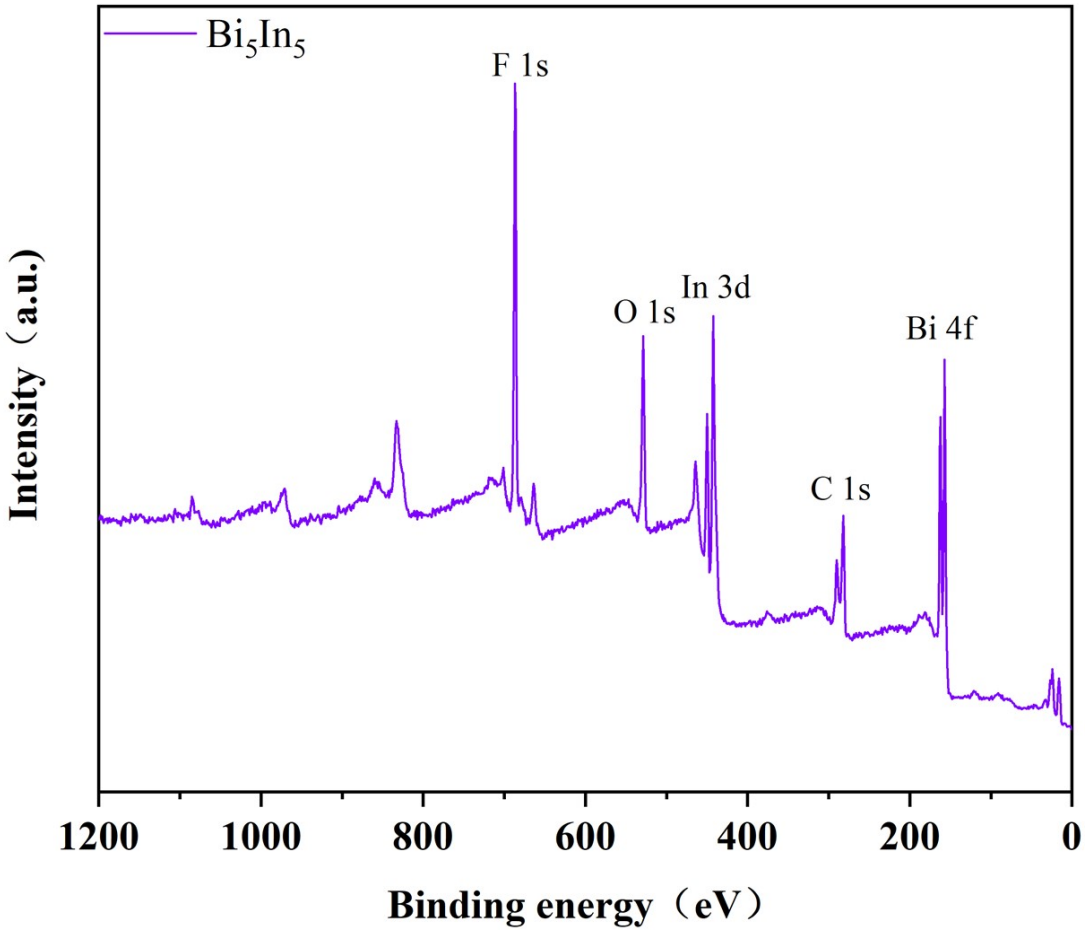

Fig. S18. full range XPS spectrum of the Bi_5In_5 NFs.

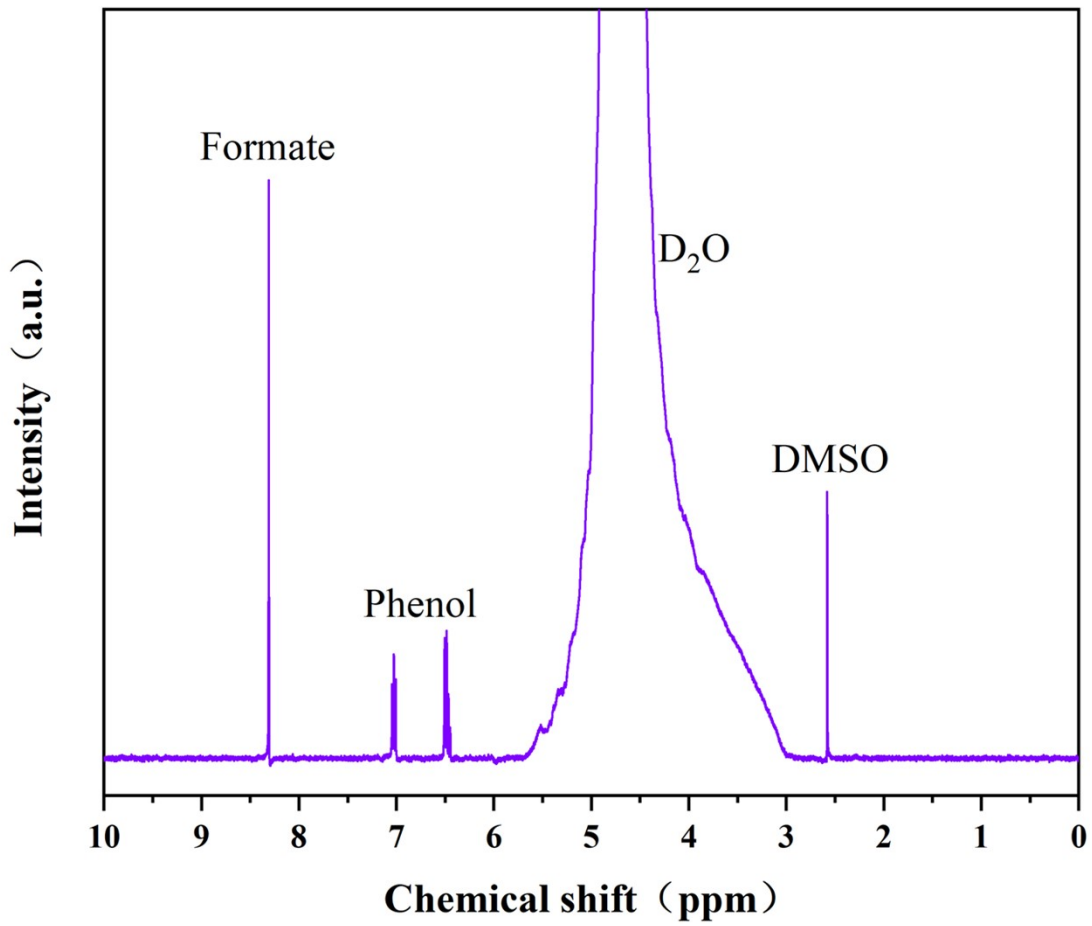

Fig. S19. ^{1}H NMR spectra of the Bi_5In_5 NFs.

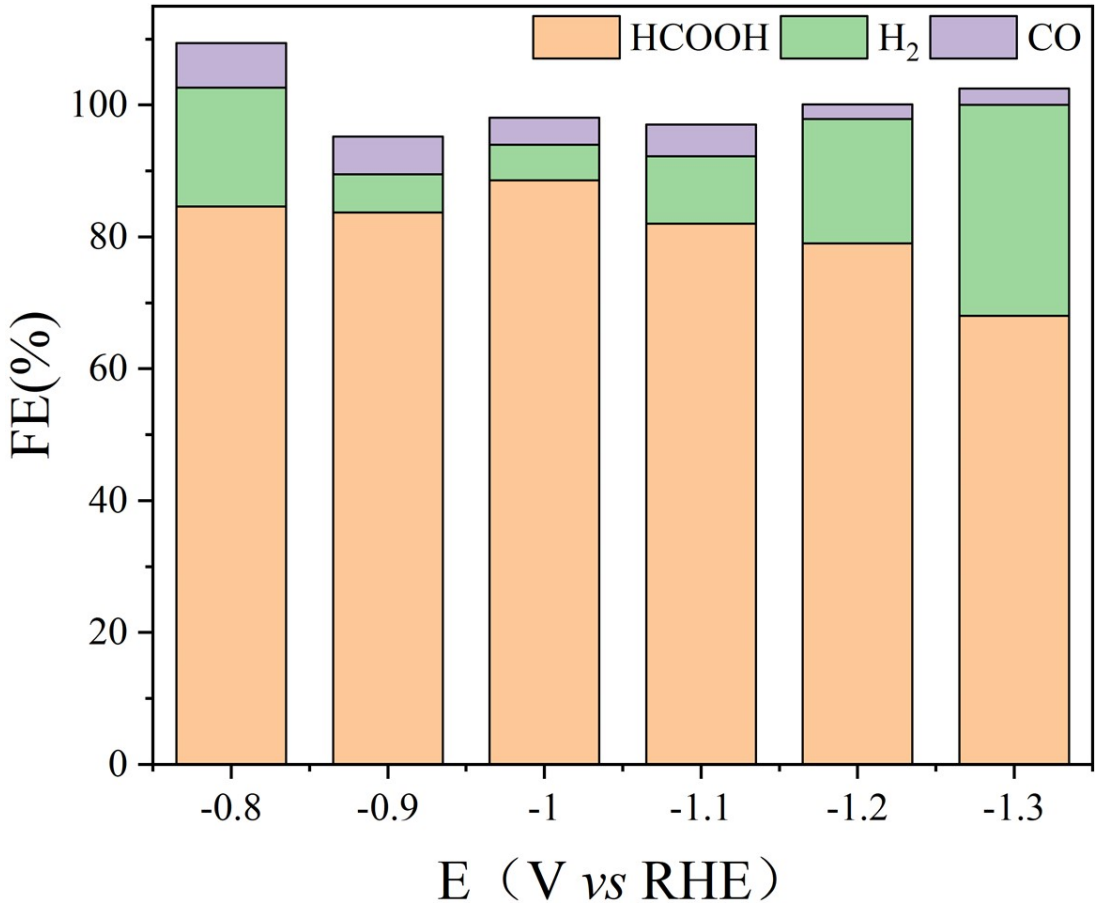

Fig. S20. FE for HCOOH, H2, CO at different potentials on Bi NF.

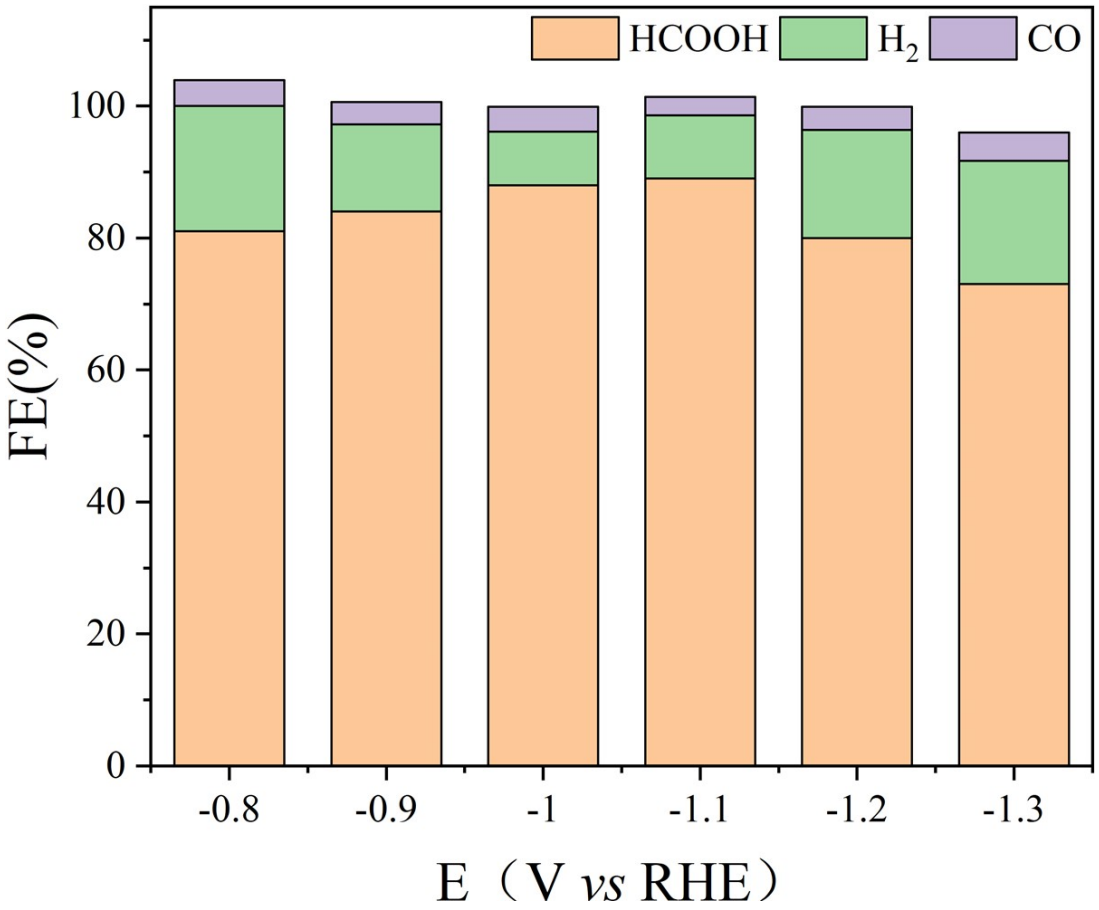

Fig. S21. FE for HCOOH, H2, CO at different potentials on Bi_7In_3 NF.

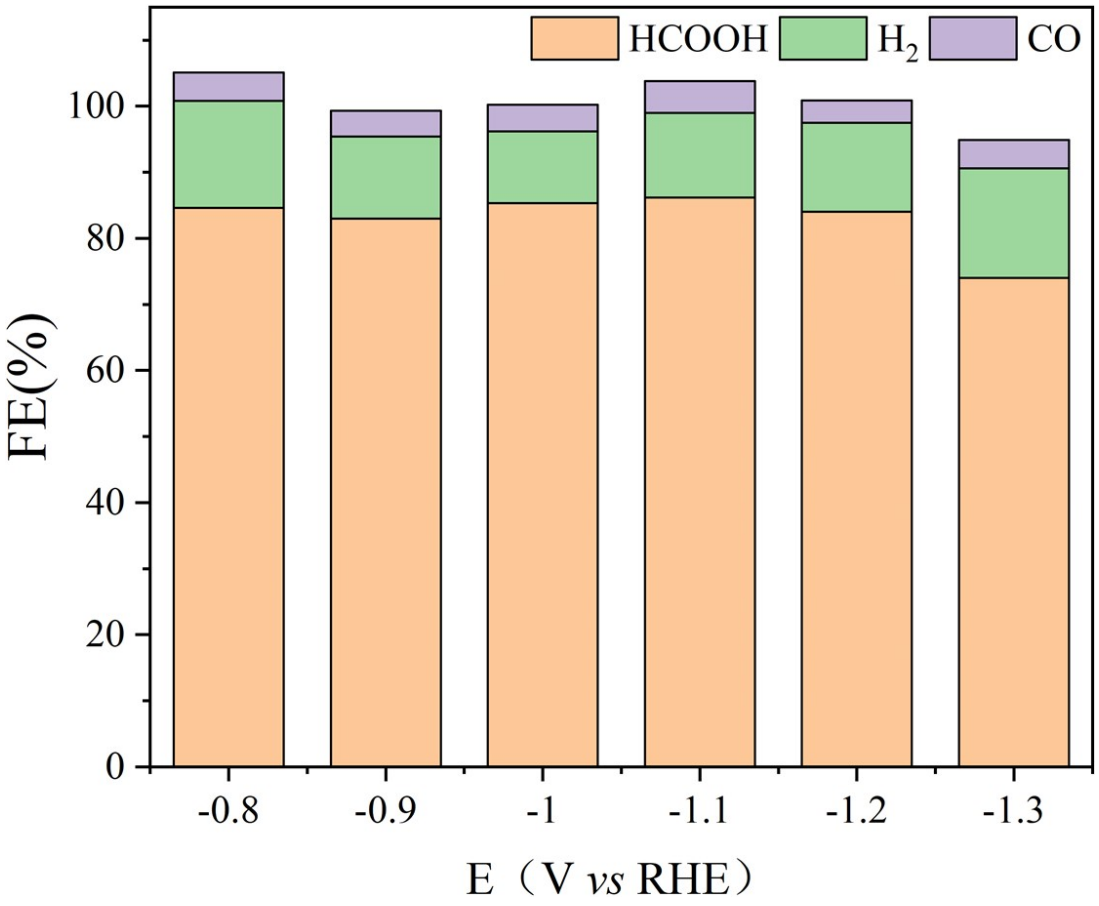

Fig. S22. FE for HCOOH, H2, CO at different potentials on Bi_3In_7 NF.

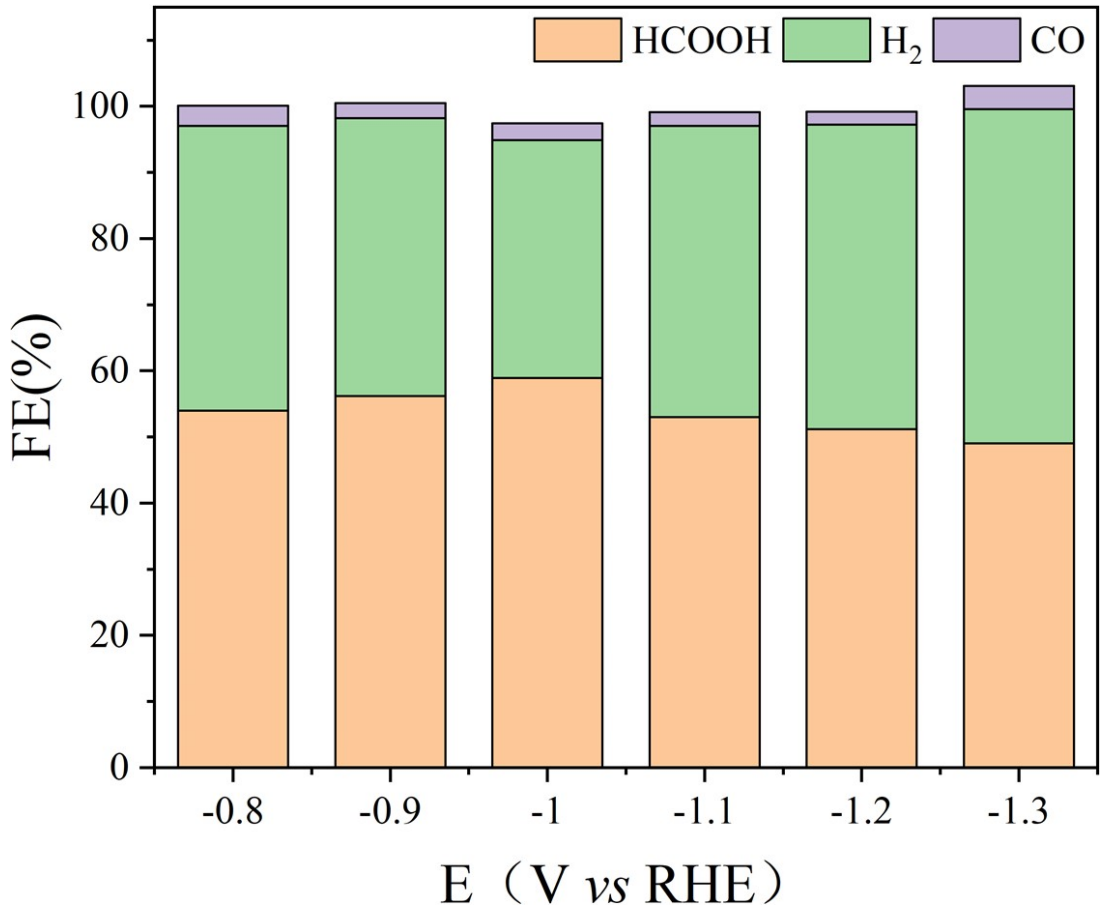

Fig. S23. FE for HCOOH, H2, CO at different potentials on In NF.

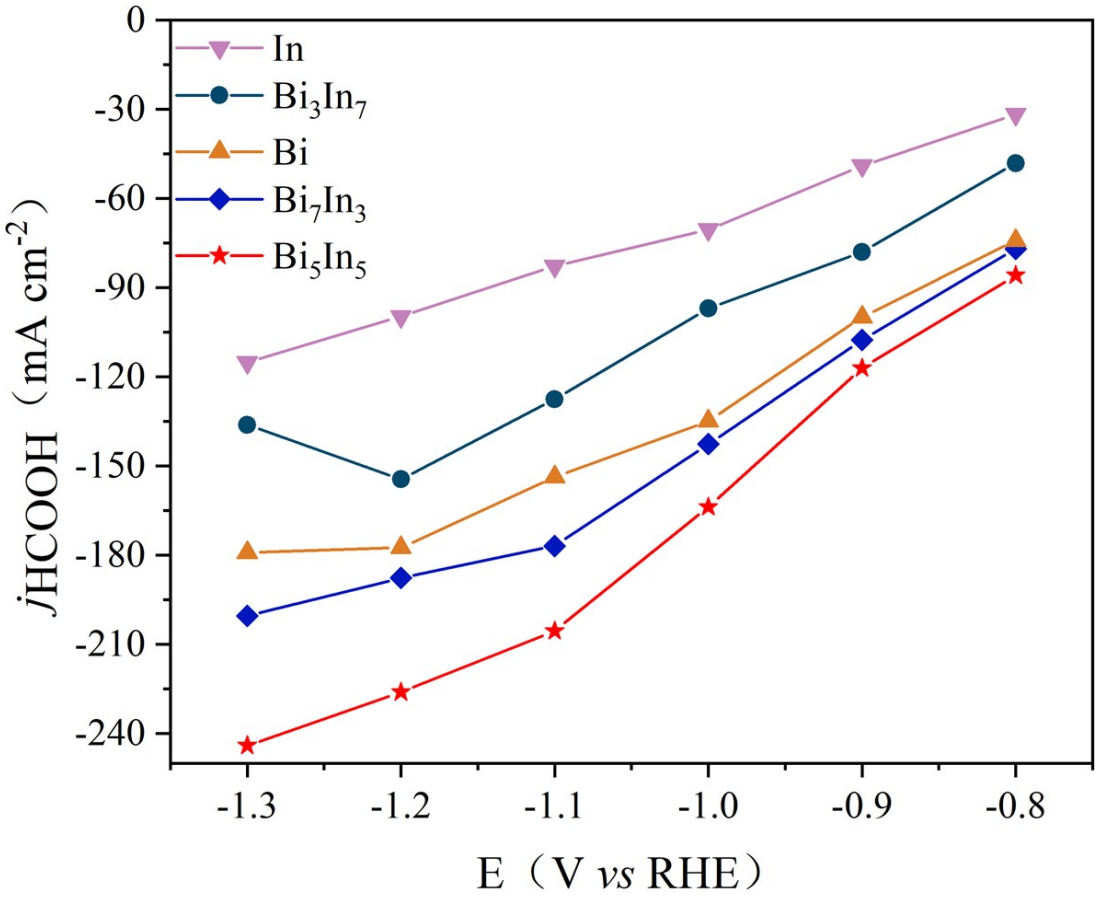

Fig. S24. Partial current densities of HCOOH on Bi_xIn_y NFs.

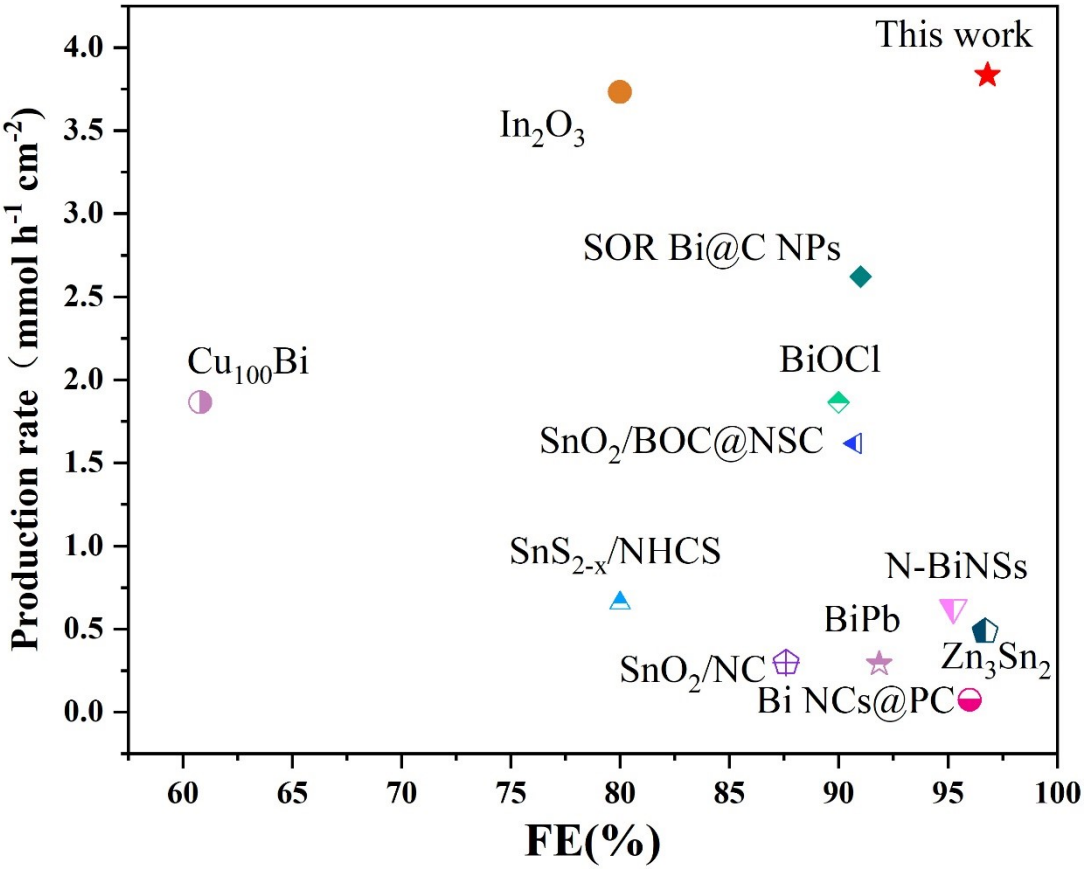

Fig. S25. Catalytic performance comparison with the recently reported catalysts.

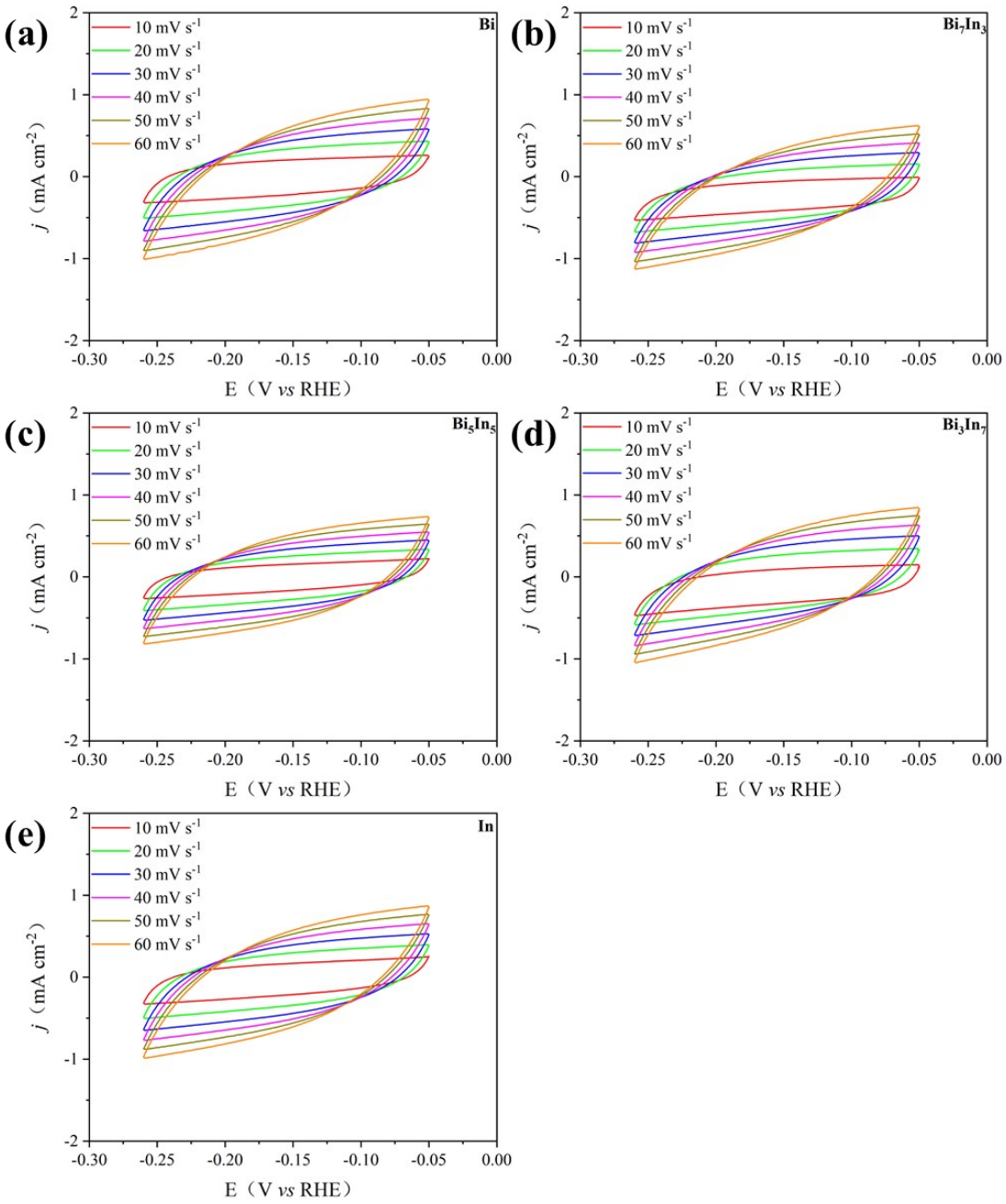

Fig. S26. CV curves of the (a) Bi NFs, (b) Bi_7In_3 NFs, (c) Bi_5In_5 NPs, (d) Bi_3In_7 NPs, and (e) In NFs.

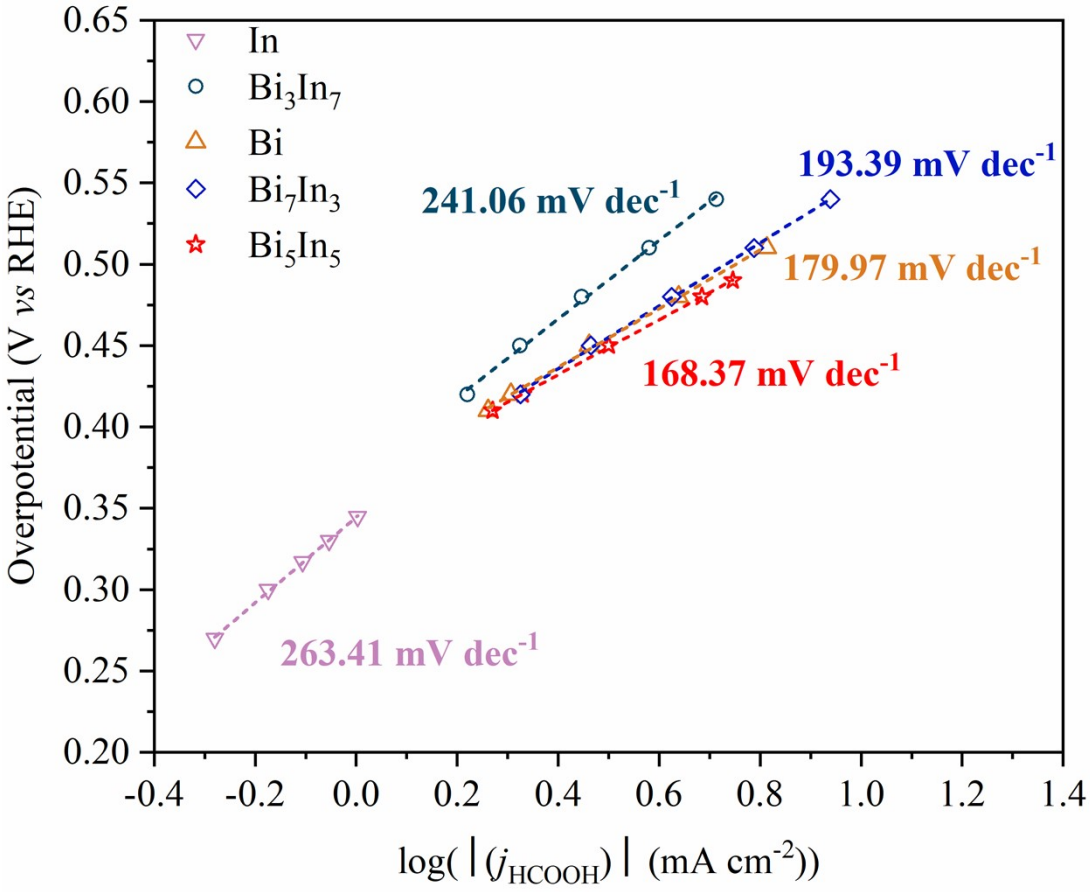

Fig. S27. The Tafel slopes of different catalysts.

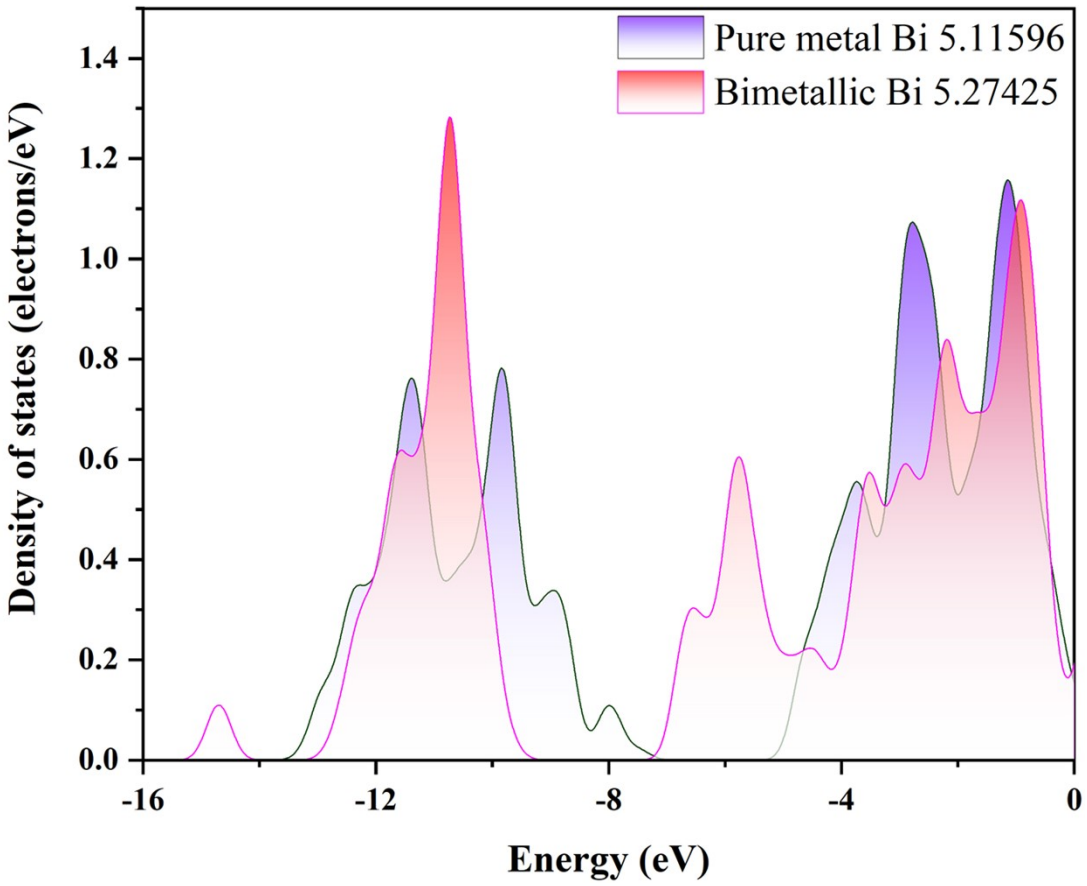

Fig. S28. Density of states for Bi atoms in InBi.

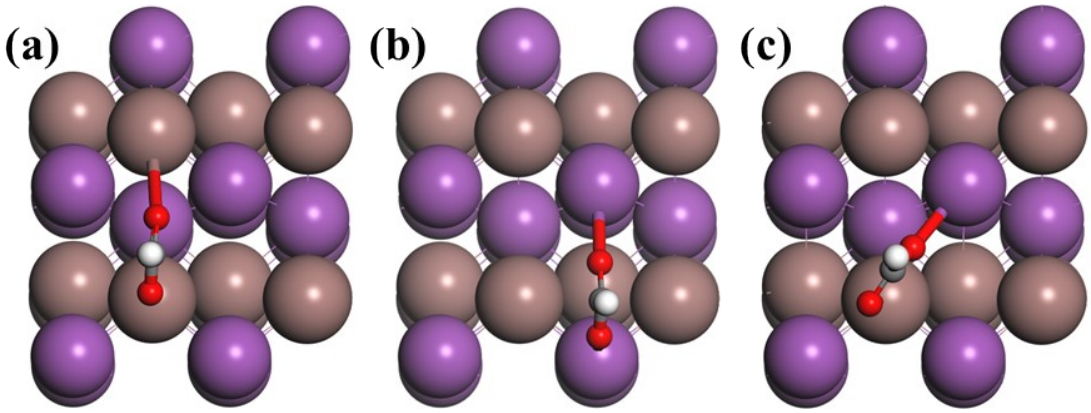

Fig. S29. *OCHO intermediate adsorption sites of (a) In-In, (b) Bi-Bi, (c) In-Bi.

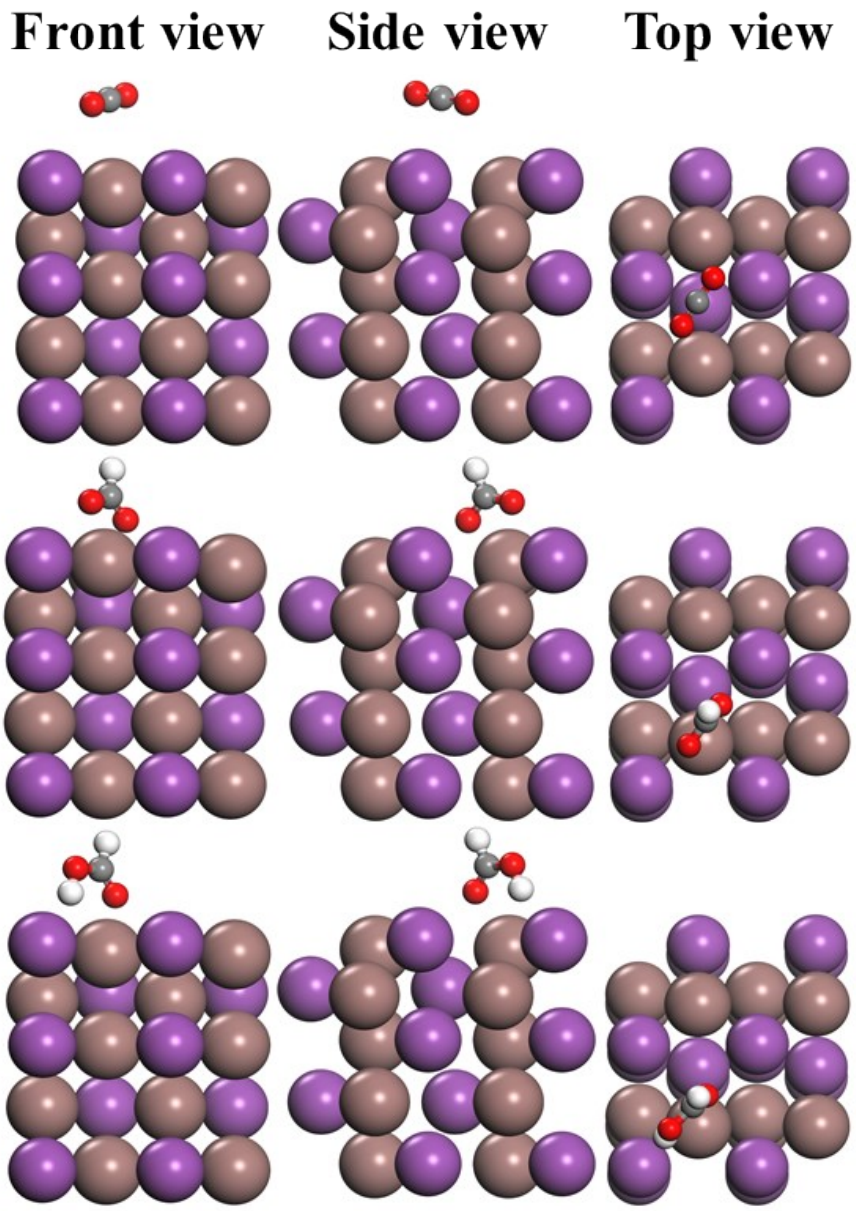

Fig. S30. Three-view Picture of DFT configurations for CO2*, *OCHO, and *HCOOH on the InBi (200) surface.

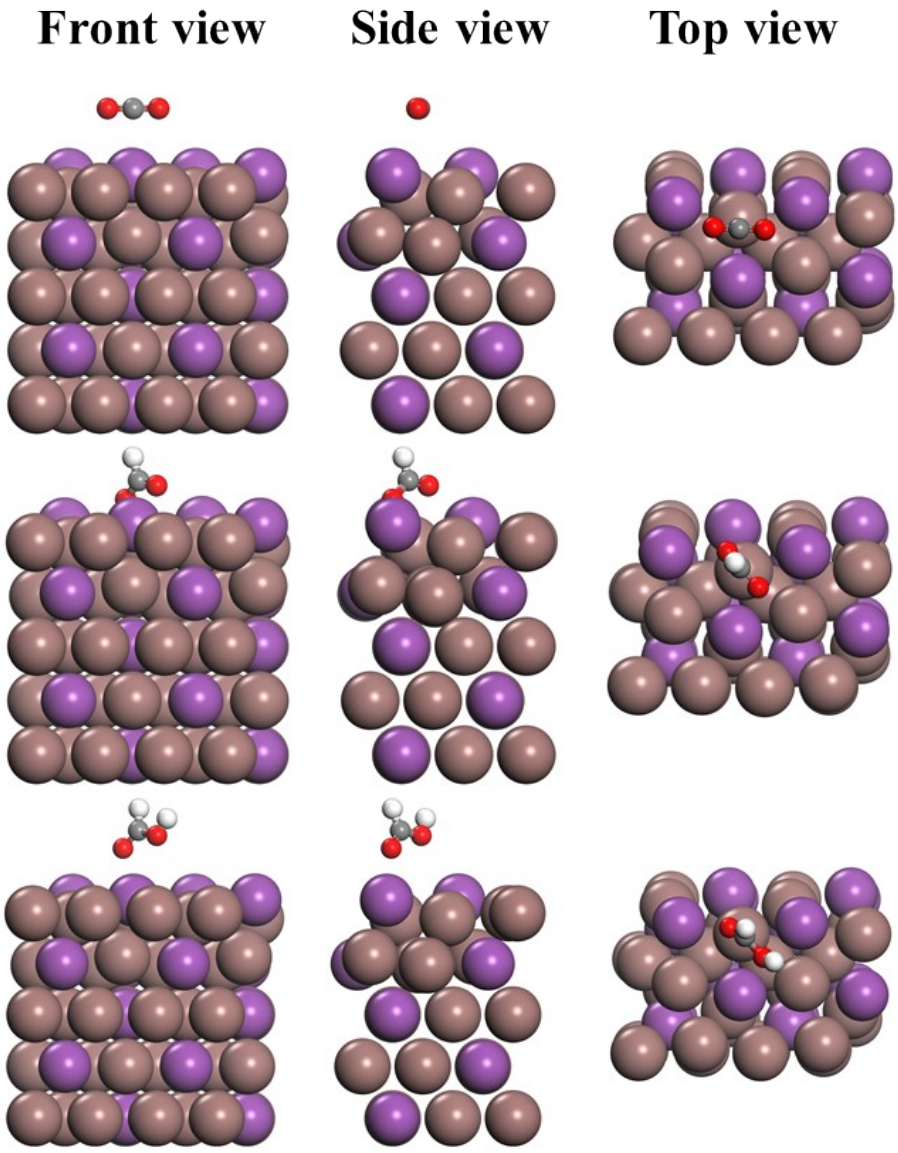

Fig. S31. Three-view Picture of DFT configurations for CO2*, *OCHO, and *HCOOH on the $BiIn_2$ (110) surface.

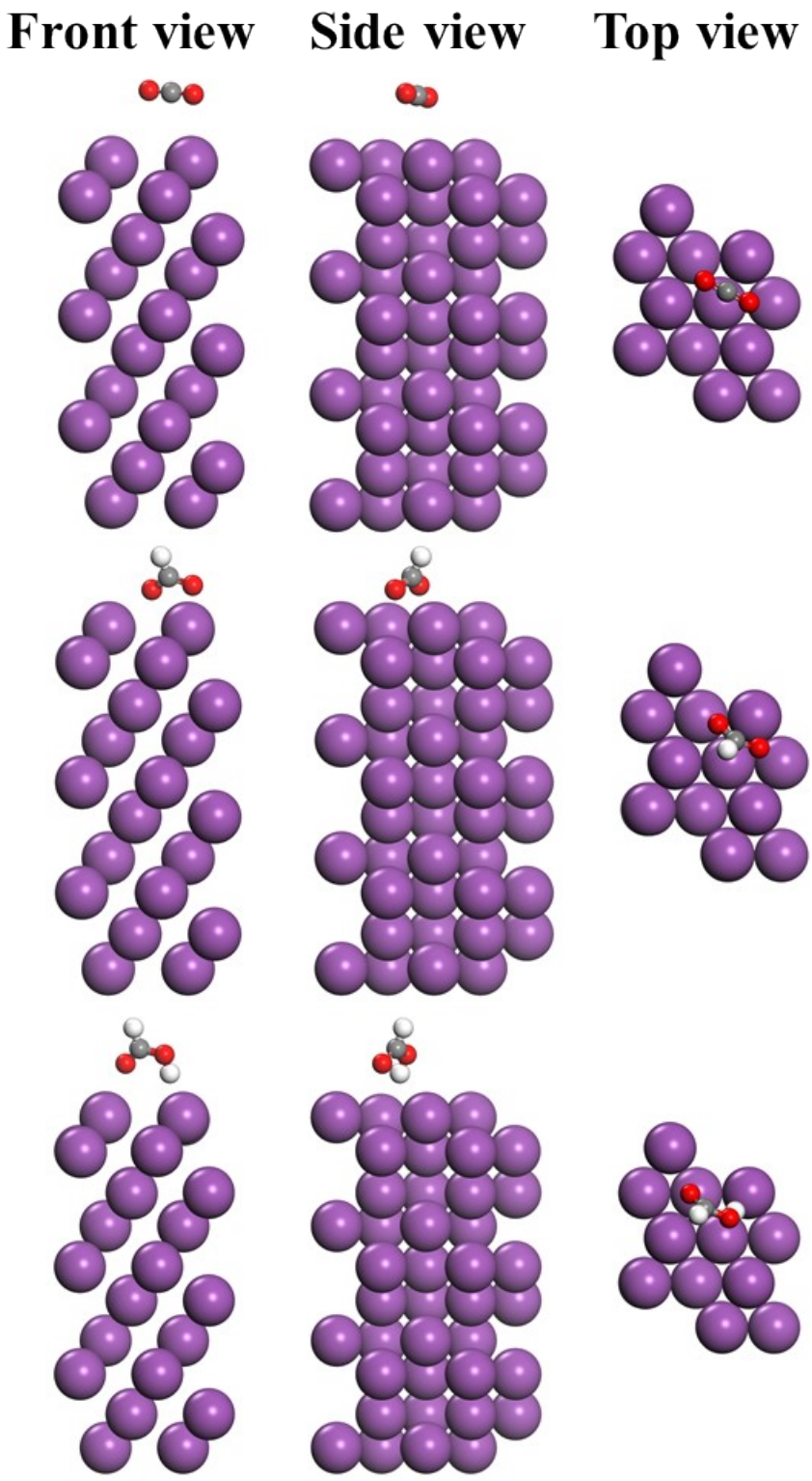

Fig. S32. Three-view Picture of DFT configurations for CO2*, *OCHO, and *HCOOH on the Bi (003) surface.

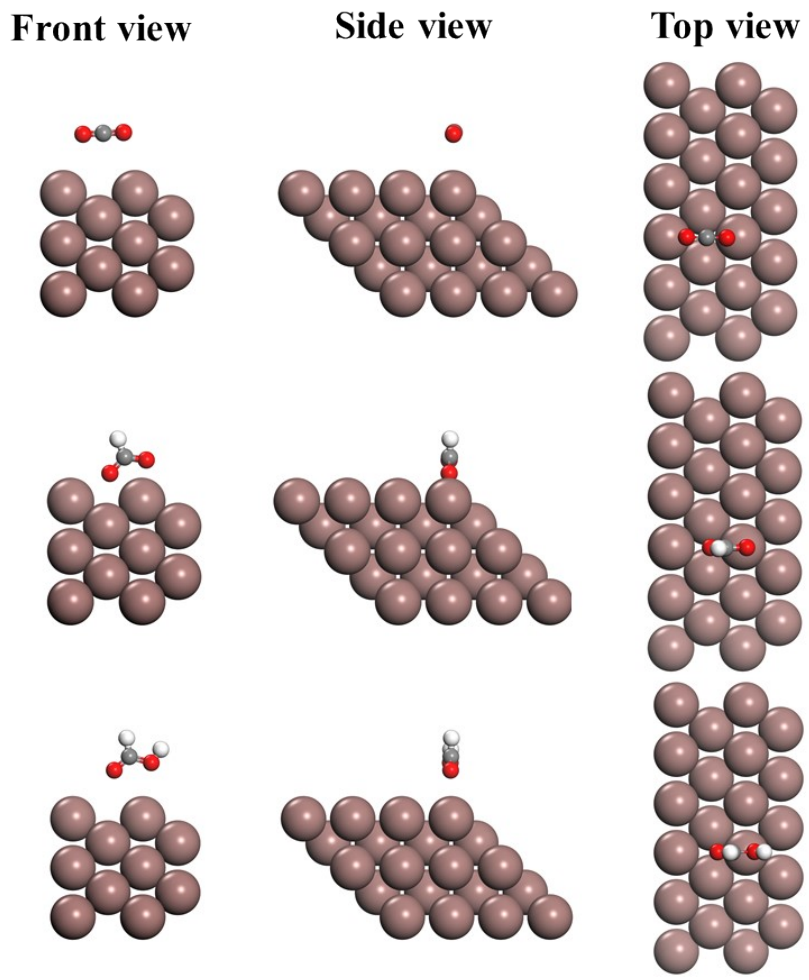

Fig. S33. Three-view Picture of DFT configurations for CO2*, *OCHO, and *HCOOH on the In (112) surface.

Table S1. EDS elemental analysis of In_xBi_y NFs.

Code	Atomic % (at%)	
	Bi	In
Bi	100	0
Bi_7In_3	67.38	32.62
Bi_5In_5	51.45	48.55
Bi_3In_7	31.56	68.44
In	100	0

Table S2. ICP analysis of In_xBi_y NFs.

Code	Atomic % (at%)	
	Bi	In
Bi_7In_3	70.59	29.41
Bi_5In_5	50.98	49.02
Bi_3In_7	31.37	68.63

Table S3. The enthalpy of In-In, Bi-Bi, and In-Bi adsorption sites with *OCHO intermediate.

	In-In	Bi-Bi	In-Bi
Final enthalpy (eV)	-44004.24994	-44004.22351	-44004.30767

Table S4. Calculated Gibbs free energy results of the intermediates on Bi, In, $BiIn_2$, InBi

Free energy (eV)	*CO_2	*OCHO	*HCOOH	HCOOH
Bi	-16899.39653	-16914.99642	-16931.08746	-1069.496642
In	-71253.59698	-71269.74023	-71285.39774	-1069.496642
$BiIn_2$	-79179.30407	-79195.26181	-79211.07316	-1069.496642
InBi	-44060.45862	-44076.43317	-44092.26833	-1069.496642