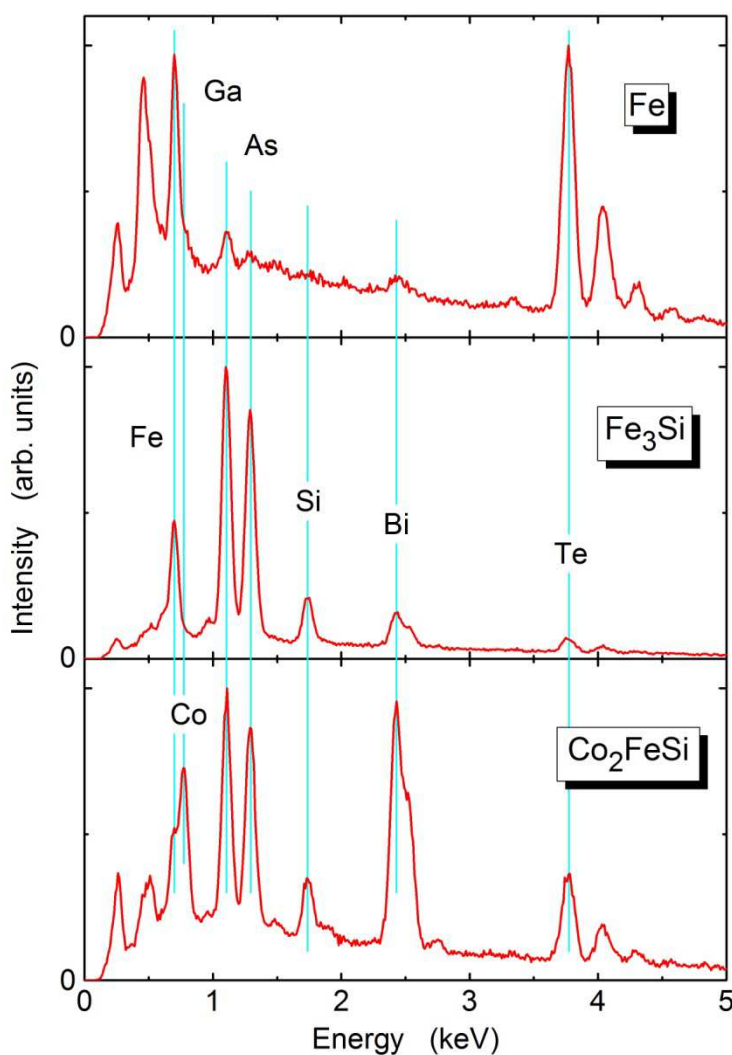
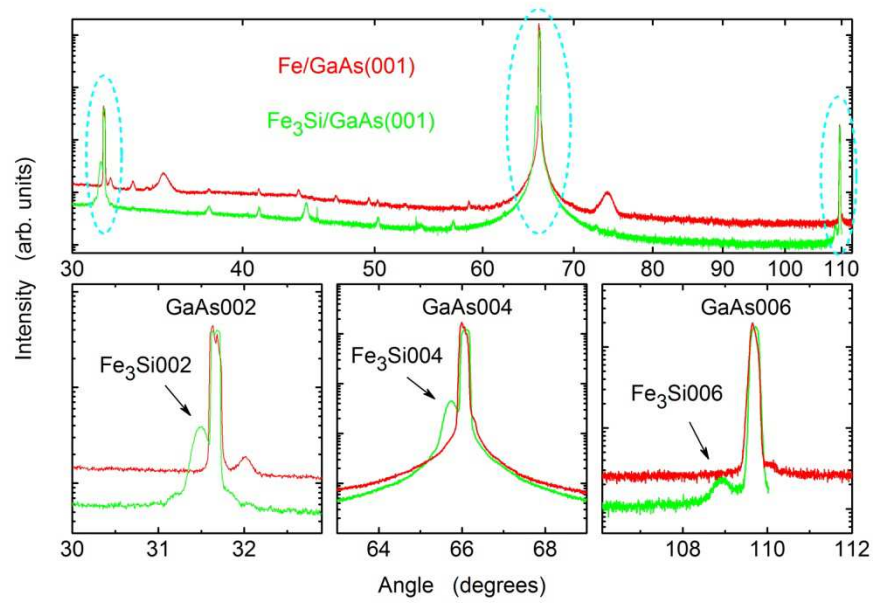


## Overgrowth of $\text{Bi}_2\text{Te}_3$ nanoislands on Fe-based epitaxial ferromagnetic layers

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**Fig. S1** EDX spectra from samples prepared by  $\text{Bi}_2\text{Te}_3$  deposition on Fe,  $\text{Fe}_3\text{Si}$  and  $\text{Co}_2\text{FeSi}$ . The ferromagnetic layers were grown on GaAs(001) substrates prior to the  $\text{Bi}_2\text{Te}_3$  deposition. The thickness of the Fe,  $\text{Fe}_3\text{Si}$  and  $\text{Co}_2\text{FeSi}$  layers were 20, 44 and 40 nm, respectively.



**Fig. S2**  $\omega$ - $2\theta$  scan curves of XRD from samples prepared by Bi<sub>2</sub>Te<sub>3</sub> deposition on Fe/GaAs(001) and Fe<sub>3</sub>Si/GaAs(001). The GaAs-related peaks in the upper panel are shown individually with expanded scales in the lower panels. The arrows indicate the peaks associated with Fe<sub>3</sub>Si in the green curve. Fe produces peaks at about the same positions indicated by the arrows. The absence of such peaks in the red curve evidences that the Fe layer was consumed completely to substitute Bi in the overgrown Bi<sub>2</sub>Te<sub>3</sub>.