Supporting Information

Manipulation of Morphologies and Magnetic Properties for Bi$_{4.2}$K$_{0.8}$Fe$_2$O$_{9+\delta}$ Nanostructures

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Fig. S1. XRD pattern of the urchin-like Bi$_{4.2}$K$_{0.8}$Fe$_2$O$_{9+\delta}$ samples obtained at $T_{\text{KOH}}$ = 50 °C and $T_{\text{HT}}$ = 90 °C.

Fig. S2. XRD patterns of the Bi$_{4.2}$K$_{0.8}$Fe$_2$O$_{9+\delta}$ samples obtained at $T_{\text{KOH}}$ = 50 °C and different $T_{\text{HT}}$ ($T_{\text{HT}}$ = 190 °C, 200 °C and 210 °C).
Fig. S3. (a) Low- and (b) high-magnification FESEM images of the Bi$_{4.2}$K$_{0.8}$Fe$_2$O$_{9+\delta}$ samples obtained at $T_{\text{KOH}} = 50$ °C and $T_{\text{HT}} = 210$ °C.

Fig. S4. Cross-section views of three different Bi$_{4.2}$K$_{0.8}$Fe$_2$O$_{9+\delta}$ nanostructures obtained at $T_{\text{KOH}} = 50$ °C and $T_{\text{HT}} = 140$ °C. All scale bars are 500 nm.
Fig. S5. (a) $M$–$H$ curves measured at 10 K for the samples fabricated at $T_{\text{KOH}} = 50 \, ^\circ\text{C}$ and different $T_{\text{HT}}$ ($T_{\text{HT}} = 90 \, ^\circ\text{C}$, $140 \, ^\circ\text{C}$, and $180 \, ^\circ\text{C}$, respectively). (b) The corresponding enlarged view for the low-field range.

Fig. S6. (a) The comparison of the $M$–$H$ curves measured at 300 K and 10 K for the Bi$_4$K$_{0.8}$Fe$_2$O$_{9+\delta}$ nanostructures obtained at $T_{\text{KOH}} = 50 \, ^\circ\text{C}$ and $T_{\text{HT}} = 90 \, ^\circ\text{C}$. (b) The corresponding enlarged view for the low-field range.

Fig. S7. Ferromagnetic-like signals at 300 K for the samples obtained at $T_{\text{KOH}} = 50 \, ^\circ\text{C}$ and different $T_{\text{HT}}$ ($T_{\text{HT}} = 90 \, ^\circ\text{C}$, $140 \, ^\circ\text{C}$, and $180 \, ^\circ\text{C}$, respectively), in which the antiferromagnetic and paramagnetic contributions calculated by a linear fitting of the $M$–$H$ curves in high magnetic field range are deducted.