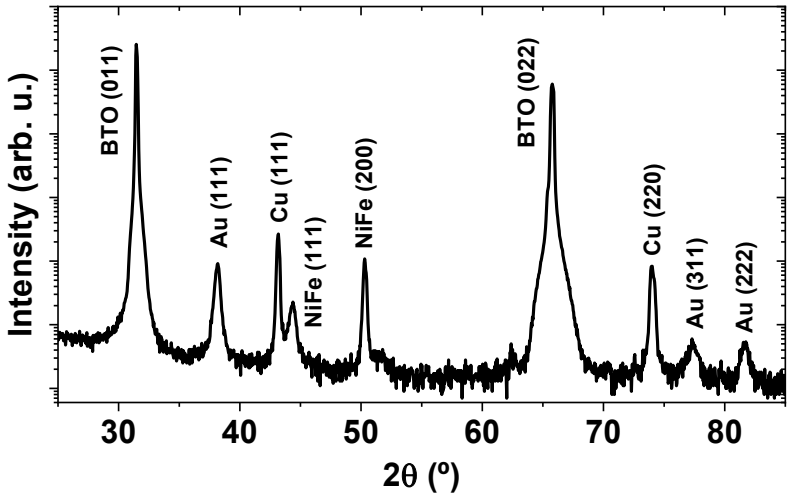
Supplementary information

1) X-ray diffraction results

Fig. Supp. 1 shows the $\theta - 2\theta$ measurement of the heterostructure. The spectrum reveals BTO(011) reflections, along with Au and NiFe peaks, while the Ti layer is not detected. Cu reflections are from the sample holder.



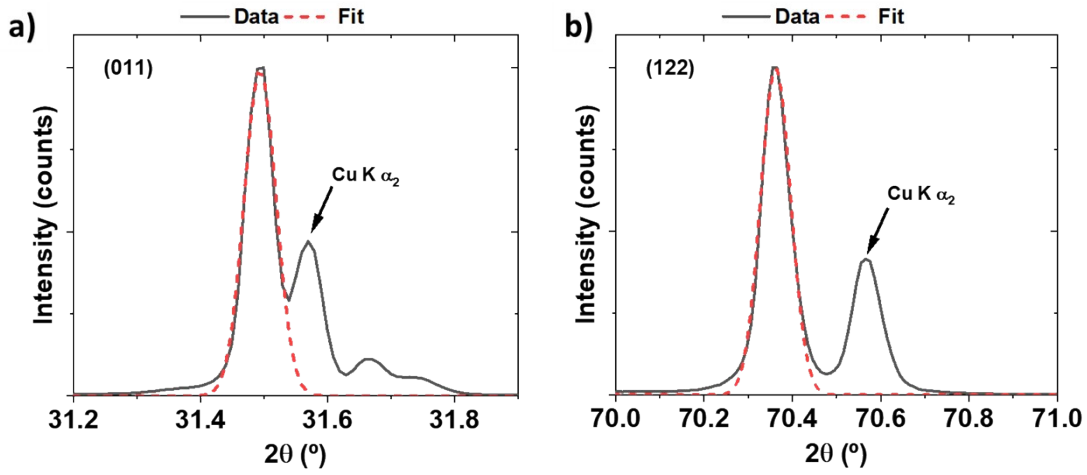
Supplementary Figure 1. θ-2θ measurement of the heterostructure.

To determine the lattice parameters *a* and *c* of the tetragonal cell of BTO, we performed reciprocal space mapping (RSM). Two reflections were used: (011) and (122). The experimental results are diffractograms obtained after centering around the ω axis. Supplementary Figure 2 shows the results obtained. We fitted the main peak using a Gaussian fit to calculate the values of *a* and *c* by employing the following equations:

$$a = \sqrt{\frac{\left(h_1^2 + k_1^2\right)l_2^2 - \left(h_2^2 + k_2^2\right)l_1^2}{d_2^2 l_2^2 - d_1^2 l_1^2}} d_1 d_2 \quad (1)$$

$$c = \sqrt{\frac{\left(h_1^2 + k_1^2\right)l_2^2 - \left(h_2^2 + k_2^2\right)l_1^2}{\left(h_1^2 + k_1^2\right)d_1^2 - \left(h_2^2 + k_2^2\right)d_2^2}} d_1 d_2 \quad (2)$$

Where h_n, k_n, l_n are the indexes of the first reflection $n = 1$, and the second reflection $n = 2$, respectively, d_n is the interplanar distance for each reflection, which can be calculated from $d = \lambda/(2\sin\theta)$, λ the x-rays wavelength and θ the angle obtained from the $2\theta - \omega$ scan. The obtained lattice constants are $a = 3.994$ and $c = 4.034$.



Supplementary Figure 2. Diffractograms obtained from RSM. Filled lines are the experimental data, and dashed lines are the Gaussian fit. (a) RSM for the (011) reflection and (b) for the (122) reflection.