Table 1: (Supporting Information) Values of the structural parameters of $BiFeO_3$. T stands for temperature, a and c are the lattice constants (in the hexagonal setting of space group $R3c$), z_{Fe}, x_O, y_O and z_O are the fractional coordinates of the Fe^{3+} and Bi^{3+} ions, respectively. R_B and χ^2 are the Bragg factor and goodness-of-fit indicator χ^2 (Rodríguez-Carvajal et al., 1993), respectively.

T [K]	a [Å]	c [Å]	z_{Fe}	x_O	y_O	z_O	R_B[%]	χ^2
298	5.57882(5)	13.86932(16)	0.22021(09)	0.44694(28)	0.01814(35)	0.95183(14)	3.03	1.44
473	5.58829(5)	13.90400(17)	0.22067(10)	0.44744(28)	0.01764(36)	0.95256(14)	3.51	1.19
503	5.58986(5)	13.90943(17)	0.22084(10)	0.44743(28)	0.01747(36)	0.95279(14)	3.50	1.14
543	5.59227(5)	13.91782(17)	0.22083(10)	0.44824(29)	0.01773(36)	0.95266(14)	3.52	1.09
623	5.59771(6)	13.93538(18)	0.22126(10)	0.44813(29)	0.01710(37)	0.95306(15)	4.07	1.04
643	5.59922(6)	13.94046(18)	0.22155(10)	0.44859(29)	0.01755(36)	0.95339(15)	4.08	1.00
663	5.60065(6)	13.94476(18)	0.22153(10)	0.44825(29)	0.01717(37)	0.95319(15)	3.61	0.98
723	5.60456(6)	13.95570(19)	0.22182(11)	0.44852(30)	0.01720(39)	0.95364(16)	4.14	0.98
823	5.61135(6)	13.97082(21)	0.22236(11)	0.44893(32)	0.01676(40)	0.95434(17)	4.24	0.89
923	5.61853(7)	13.98240(21)	0.22288(12)	0.45020(34)	0.01695(43)	0.95544(18)	4.45	0.83

Table 2: (Supporting Information) Values of the anisotropic temperature parameters U_{ij} [Å^2] refined for $BiFeO_3$ as a function of temperature. The form of the temperature factor is $\exp[-2\pi^2(U_{11}h^2a^{*2} + U_{22}k^2b^{*2} + U_{33}l^2c^{*2} + 2U_{12}hka^*b^* + ...)]$.

T [K]	Atom	U_{11}	U_{22}	U_{33}	U_{12}	U_{13}	U_{23}
298	Bi	0.0081(7)	0.0081(7)	0.0000(9)	0.0040(7)	0.0	0.0
	Fe	0.0044(6)	0.0044(6)	0.0053(9)	0.0022(6)	0.0	0.0
	O	0.0101(3)	0.0079(3)	0.0062(2)	0.0034(3)	0.0016(3)	-0.0011(3)
473	Bi	0.0158(8)	0.0158(8)	0.0031(9)	0.0079(8)	0.0	0.0
	Fe	0.0069(6)	0.0069(6)	0.0111(10)	0.0035(6)	0.0	0.0
	0	0.0163(3)	0.0120(3)	0.0083(2)	0.0055(3)	0.0016(3)	-0.0031(3)
503	Bi	0.0171(8)	0.0171(8)	0.0047(9)	0.0085(8)	0.0	0.0
	Fe	0.0078(6)	0.0078(6)	0.0094(10)	0.0039(6)	0.0	0.0
	O	0.0178(3)	0.0120(3)	0.0098(2)	0.0055(3)	0.0013(3)	-0.0031(3)
543	Bi	0.0188(8)	0.0188(8)	0.0056(9)	0.0094(8)	0.0	0.0
	Fe	0.0082(6)	0.0082(6)	0.0109(10)	0.0041(6)	0.0	0.0
	O	0.0196(3)	0.0136(3)	0.0105(3)	0.0064(3)	0.0014(3)	-0.0032(3)
623	Bi	0.0219(9)	0.0219(9)	0.0075(10)	0.0110(9)	0.0	0.0
	Fe	0.0099(6)	0.0099(6)	0.0121(10)	0.0050(6)	0.0	0.0
	O	0.0232(3)	0.0149(4)	0.0125(3)	0.0079(3)	0.0023(3)	-0.0038(3)
643	Bi	0.0236(9)	0.0236(9)	0.0075(10)	0.0118(9)	0.0	0.0
	Fe	0.0104(6)	0.0104(6)	0.0132(10)	0.0052(6)	0.0	0.0
	O	0.0234(3)	0.0152(4)	0.0130(3)	0.0076(3)	0.0017(3)	-0.0043(3)
663	Bi	0.0245(9)	0.0245(9)	0.0081(10)	0.0123(9)	0.0	0.0
	Fe	0.0105(6)	0.0105(6)	0.0132(11)	0.0053(6)	0.0	0.0
	O	0.0246(3)	0.0161(4)	0.0141(3)	0.0083(3)	0.0032(3)	-0.0040(3)
723	Bi	0.0272(10)	0.0272(10)	0.0085(10)	0.0136(10)	0.0	0.0
	Fe	0.0123(7)	0.0123(7)	0.0159(10)	0.0062(7)	0.0	0.0
	O	0.0266(4)	0.0167(4)	0.0159(3)	0.0085(3)	0.0021(4)	-0.0051(3)
823	Bi	0.0320(11)	0.0320(11)	0.0144(12)	0.0160(11)	0.0	0.0
	Fe	0.0144(7)	0.0144(7)	0.0155(11)	0.0072(7)	0.0	0.0
	O	0.0322(4)	0.0184(4)	0.0200(4)	0.0094(4)	0.0019(4)	-0.0061(4)
923	Bi	0.0380(11)	0.0380(11)	0.0172(12)	0.0190(11)	0.0	0.0
	Fe	0.0161(7)	0.0161(7)	0.0190(12)	0.0081(7)	0.0	0.0
	O	0.0373(5)	0.0200(4)	0.0233(4)	0.0097(4)	0.0015(5)	-0.0071(4)