Supporting Information

Figure S1. EDS analysis on the selected regions of the sample sintered at 1200 ℃

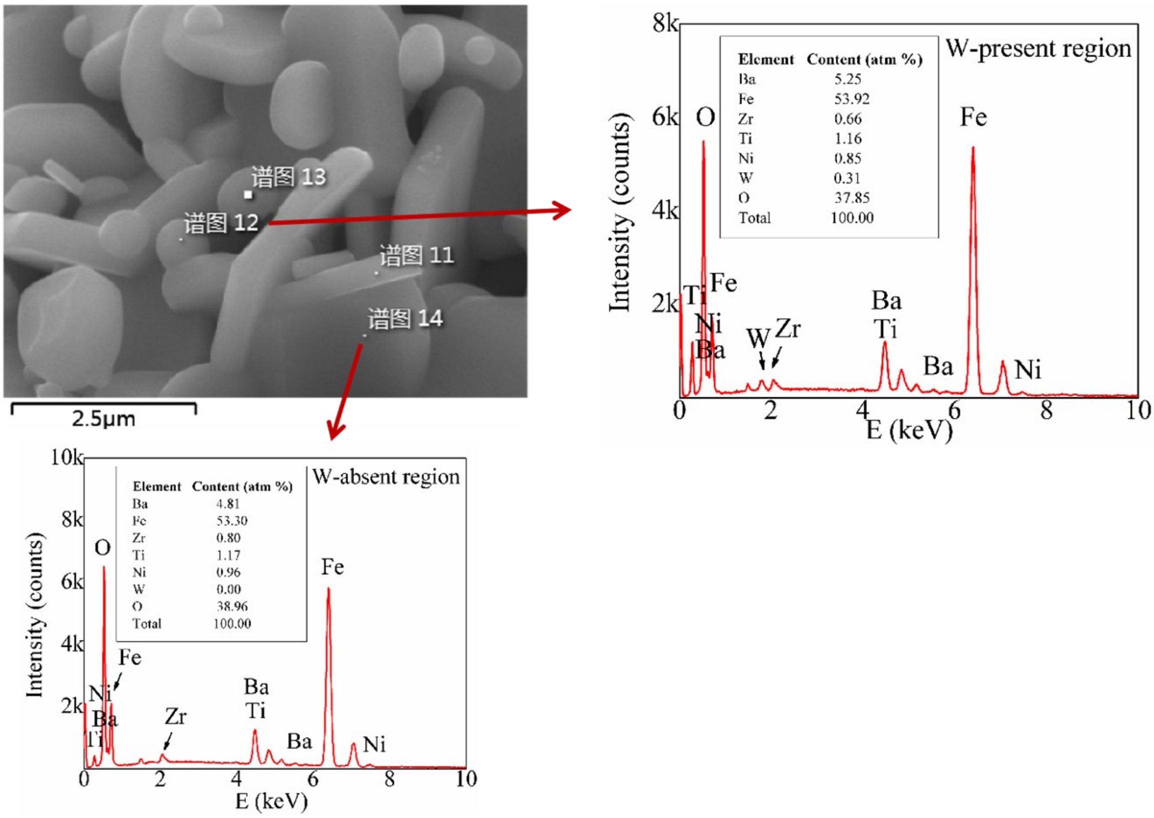

Figure S2. EDS analysis on the selected regions of the sample sintered at 1300 ℃

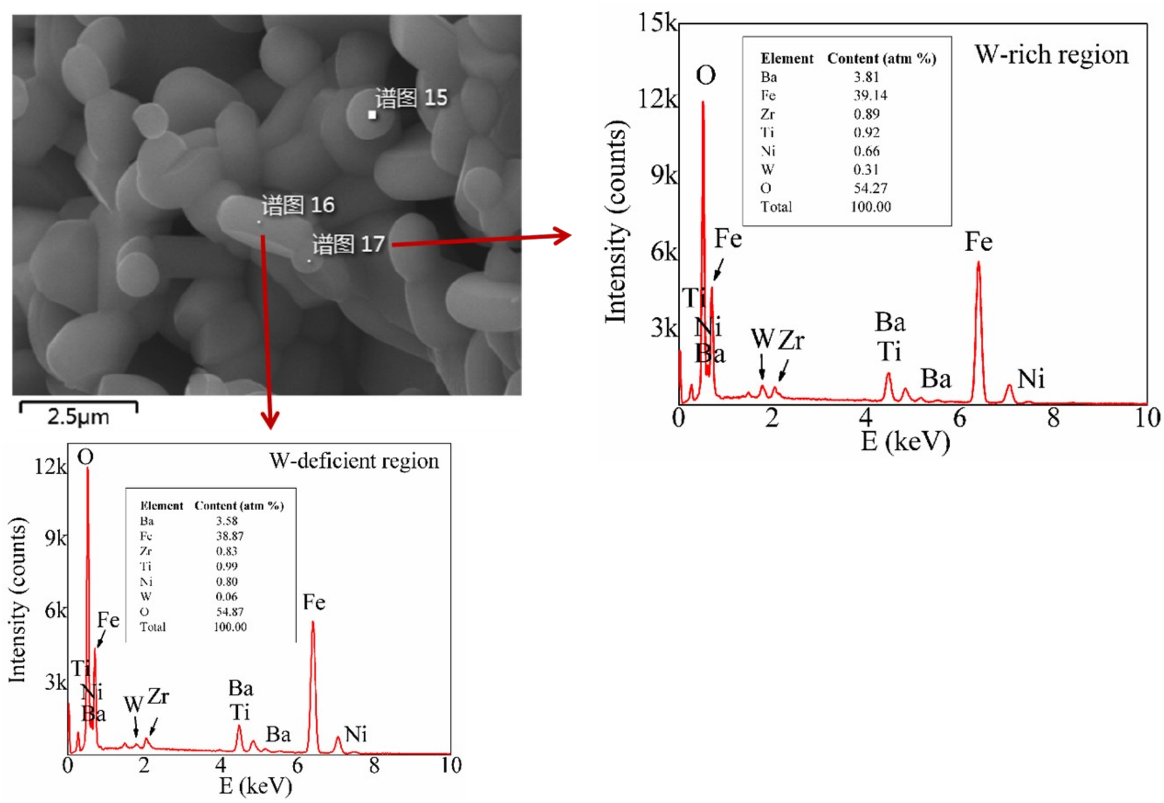

Figure S3. EDS analysis of the sample sintered at 1400 ℃

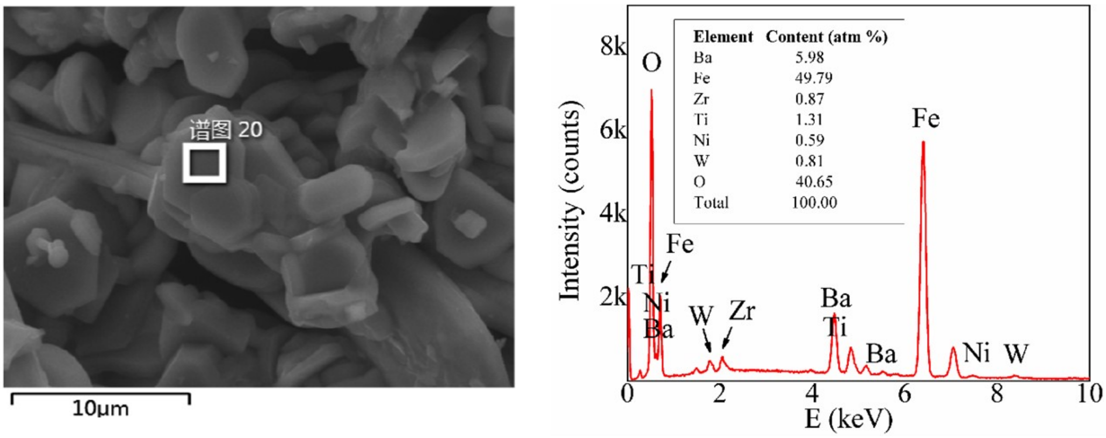

Table S1. Lattice constants of the samples sintered at 1200 ℃, 1300 ℃ and 1400 ℃, respectively. Note that the pristine values are a=b=5.892 Å, c=23.198 Å, c/a=3.937, Volume=697.4 Å^3.

Sample	**a [Å]**	**c [Å]**	**c/a**	**Volume [Å^3]**
1200	5.871	23.194	3.951	692.3
1300	5.888	23.237	3.946	697.6
1400	5.888	23.237	3.946	697.6

Figure S4. The imaginary part of complex permeability as a function of frequency in K and R bands for the sample sintered at 1200 ℃. An almost symmetric loss peak was observed.

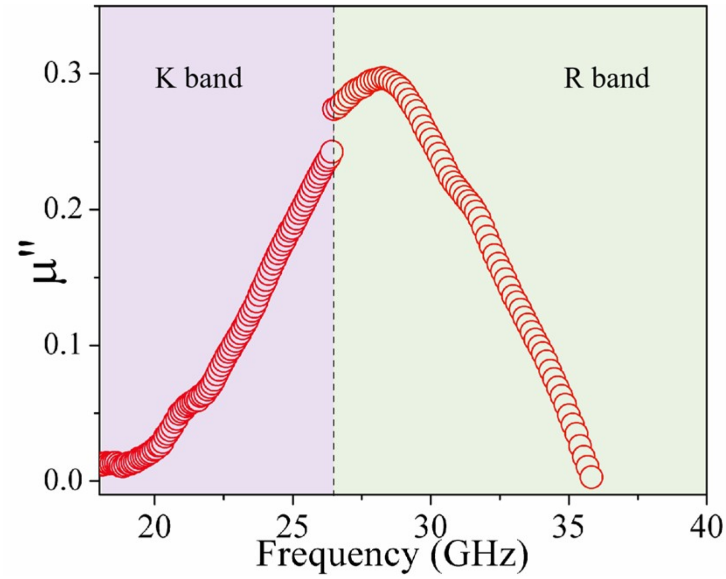

Figure S5. Reflection loss as a function of frequency at different thicknesses in K band for the samples sintered at 1200 ℃ and 1300 ℃, respectively.

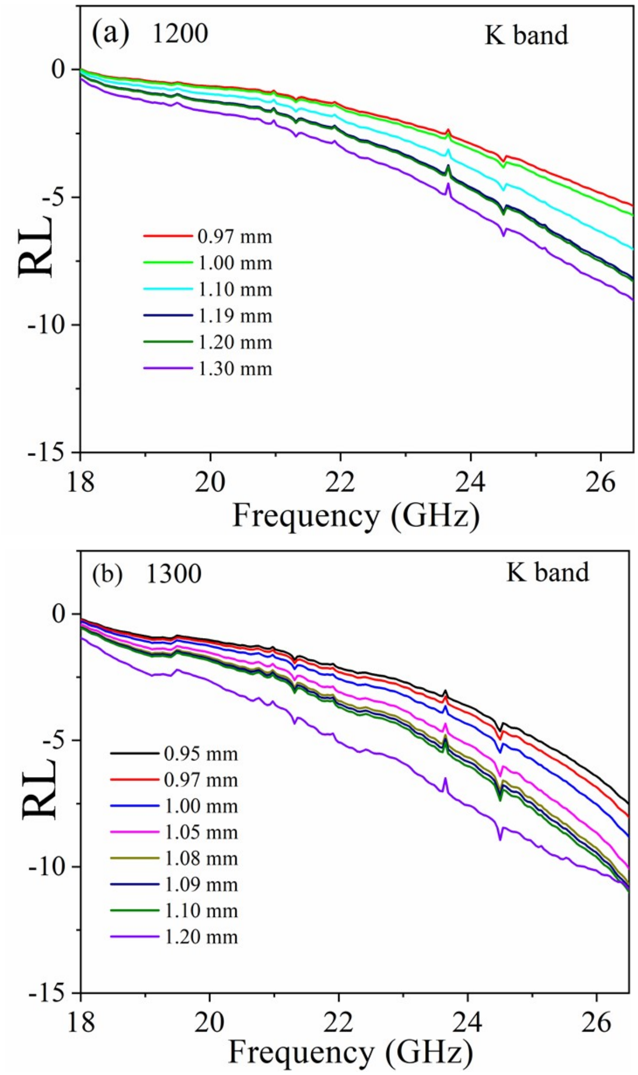

Table S2. Experimental, theoretical and numerical fitting parameters of the multi-elemental co-doped BFO absorbers in the investigated frequency range (18-40 GHz)

Sample	M_s (emu/g)	H_a (kOe)	K_1 (×10^5 erg/cm^3)	χ_p (×10^{-4})	H_c (kOe)	g-factor	f_r (GHz)	RL_{min} (dB)	f_{min} (GHz)	−10 dB Bandwidth (GHz)	−20 dB Bandwidth (GHz)	t_m (mm)	σ (S/cm)
1200	45.33	8.167	1.851	3.912	1.416	2.465	28.18	−15.6	29.88	7.67	0	1.19	3.51×10^{-5}
						2.310	26.5						
1300	46.62	8.194	1.910	4.493	0.916	2.528	29.0	−32.6	29.13	10.61	5.23	1.09	1.80×10^{-5}
						2.955	33.9						
						2.246	25.6						
1400	49.10	8.142	1.999	4.338	0.245	2.290	26.1	−61.8	33.58	13.60	9.15	0.97	1.17×10^{-4}
						2.737	31.2						

Figure S6. Comparison of the core performance parameters (RL, bandwidth and matching thickness) of the multi-elemental co-doped BFO absorber with recently developed millimeter-wave absorbers and representative commercial products using (a)−10 dB, (b)−25 dB and (c) −20 dB as the criterion for the determination of effective bandwidth. Note that commercial products disappear in Fig. S6b as their −25 dB bandwidth diminishes to zero.