Electronic Supplementary Material (ESI) for RSC Advances.

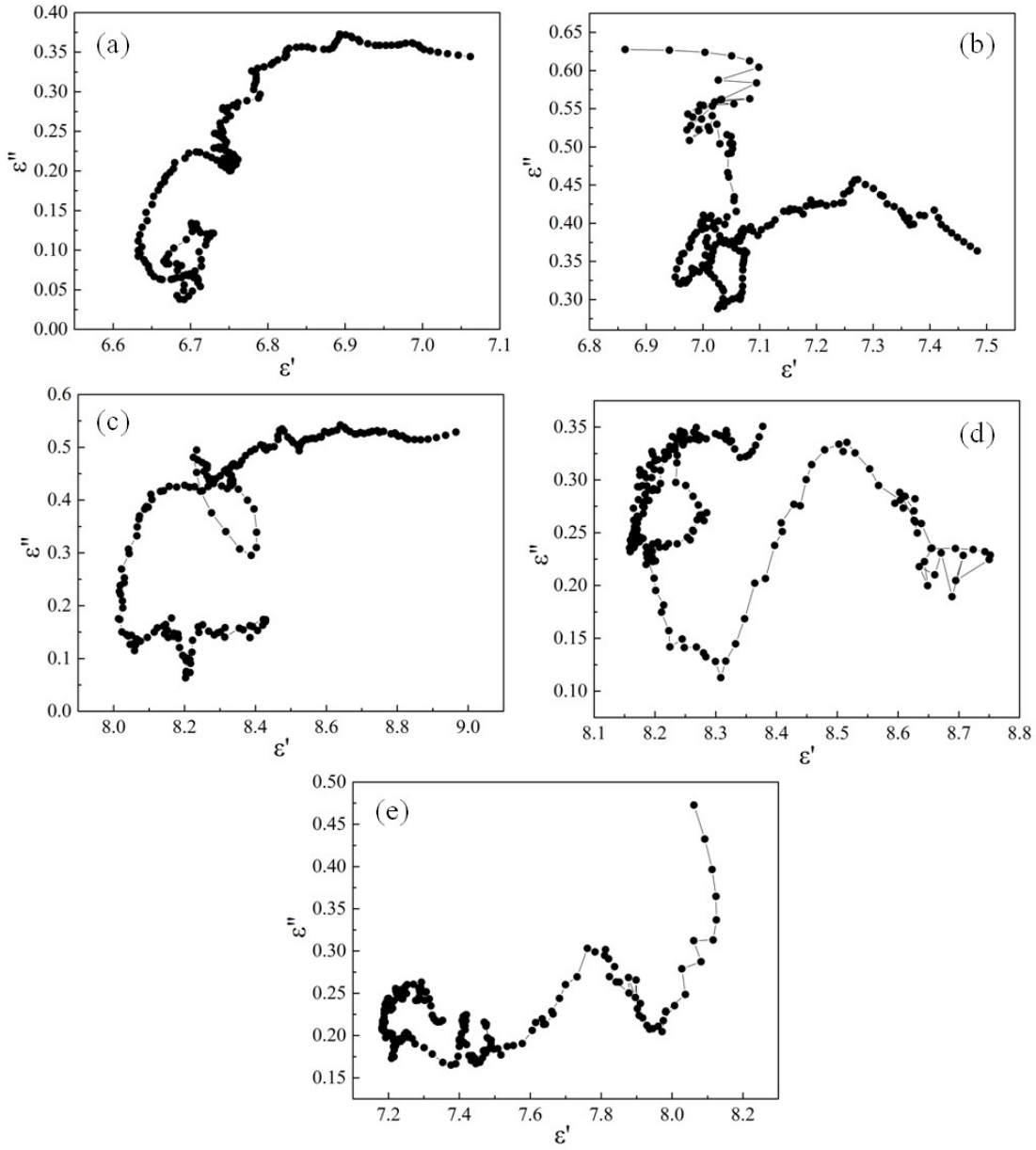

Fig. S1. Cole-cole semicircles of as-milled $FeCoNiSi_xAl_{0.4}$ (a-e for x= 0.1, 0.2, 0.3, 0.4, and 0.5) HEA powders.

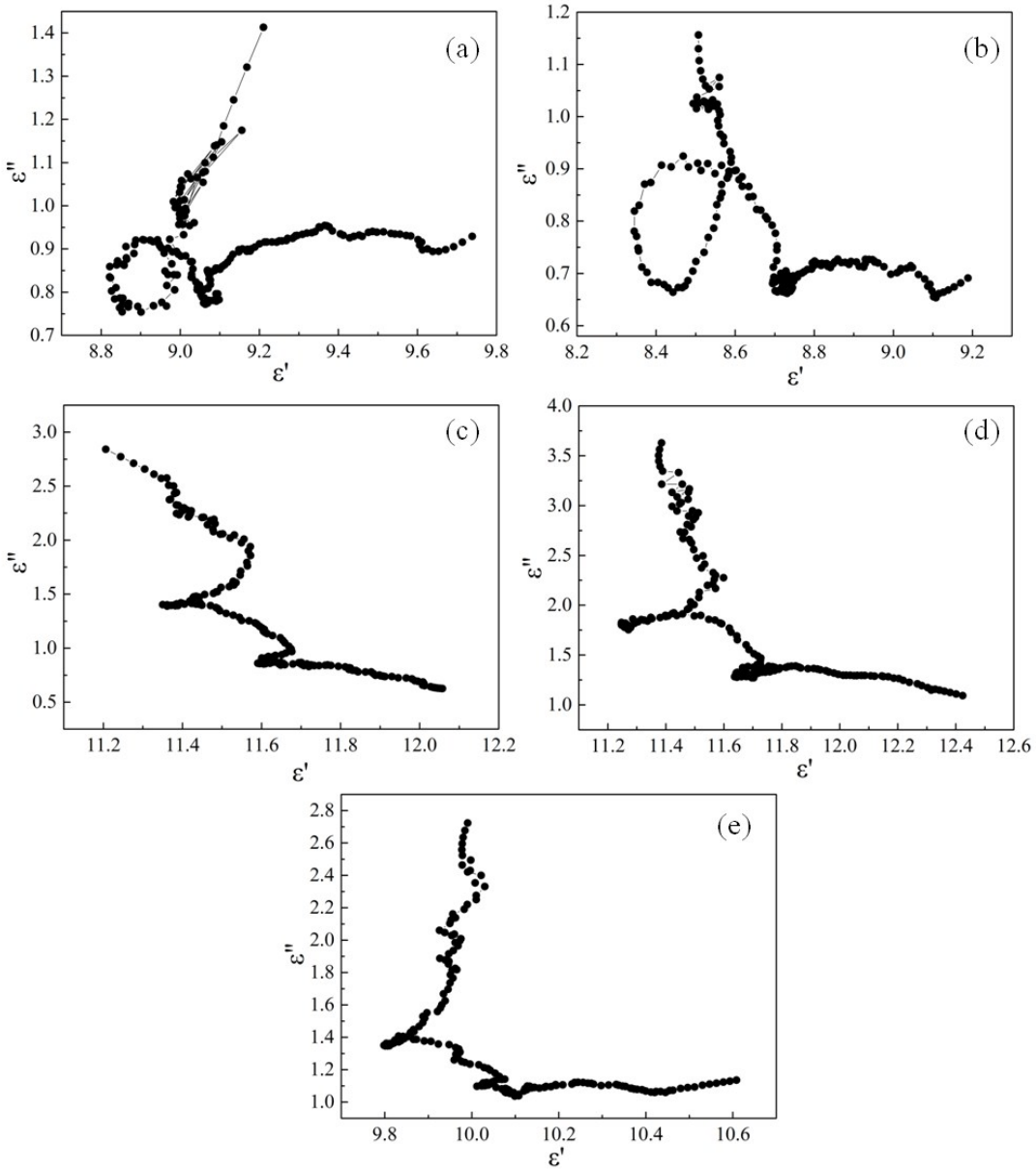

Fig. S2. Cole-cole semicircles of as-annealed $FeCoNiSi_xAl_{0.4}$ (a-e for x= 0.1, 0.2, 0.3, 0.4, and 0.5) HEA powders.

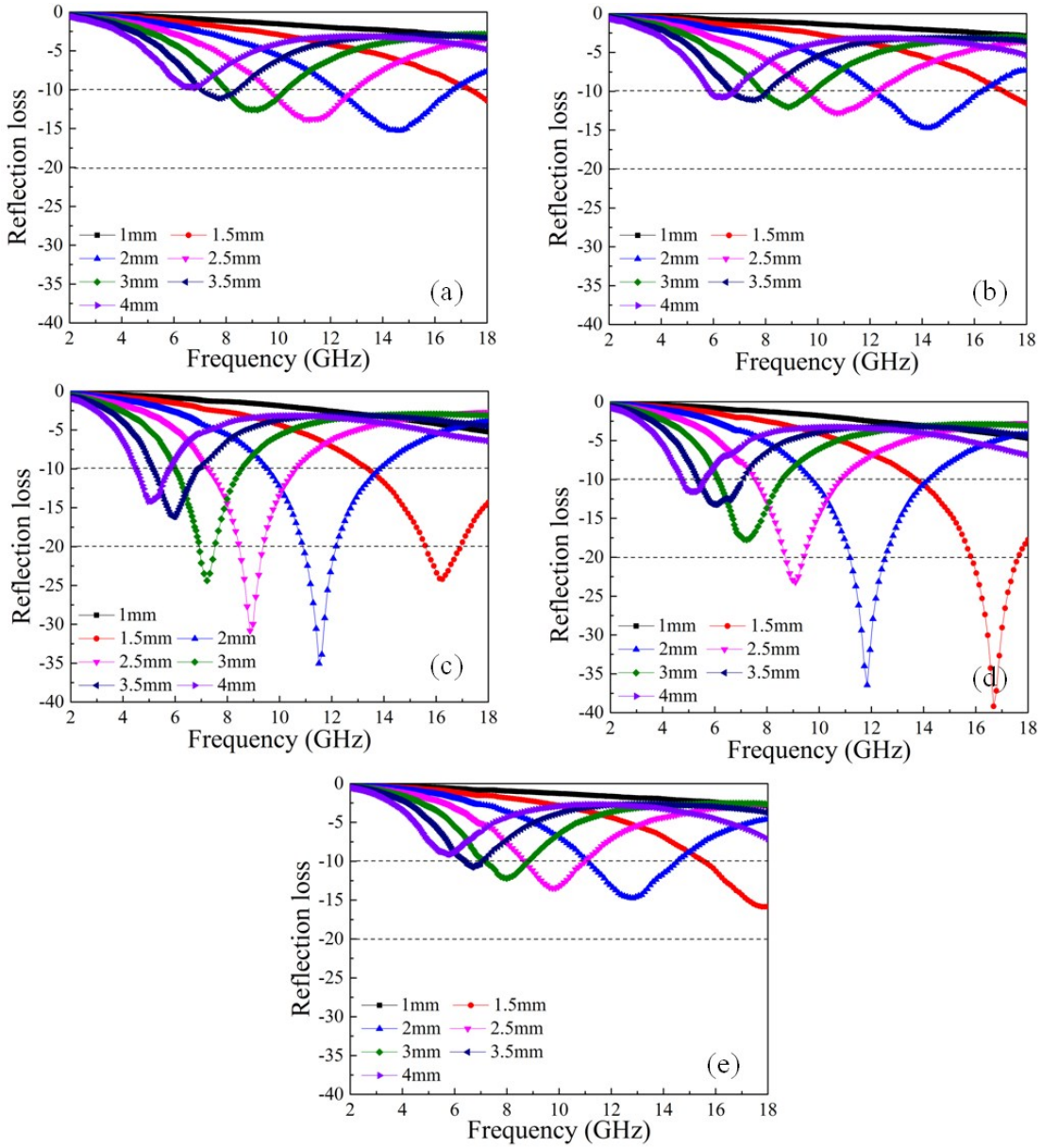

Fig. S3. Reflection loss of the as-milled $FeCoNiSi_xAl_{0.4}$ (a-e for x= 0.1, 0.2, 0.3, 0.4, and 0.5) HEA powders in the frequency range of 2-18GHz.

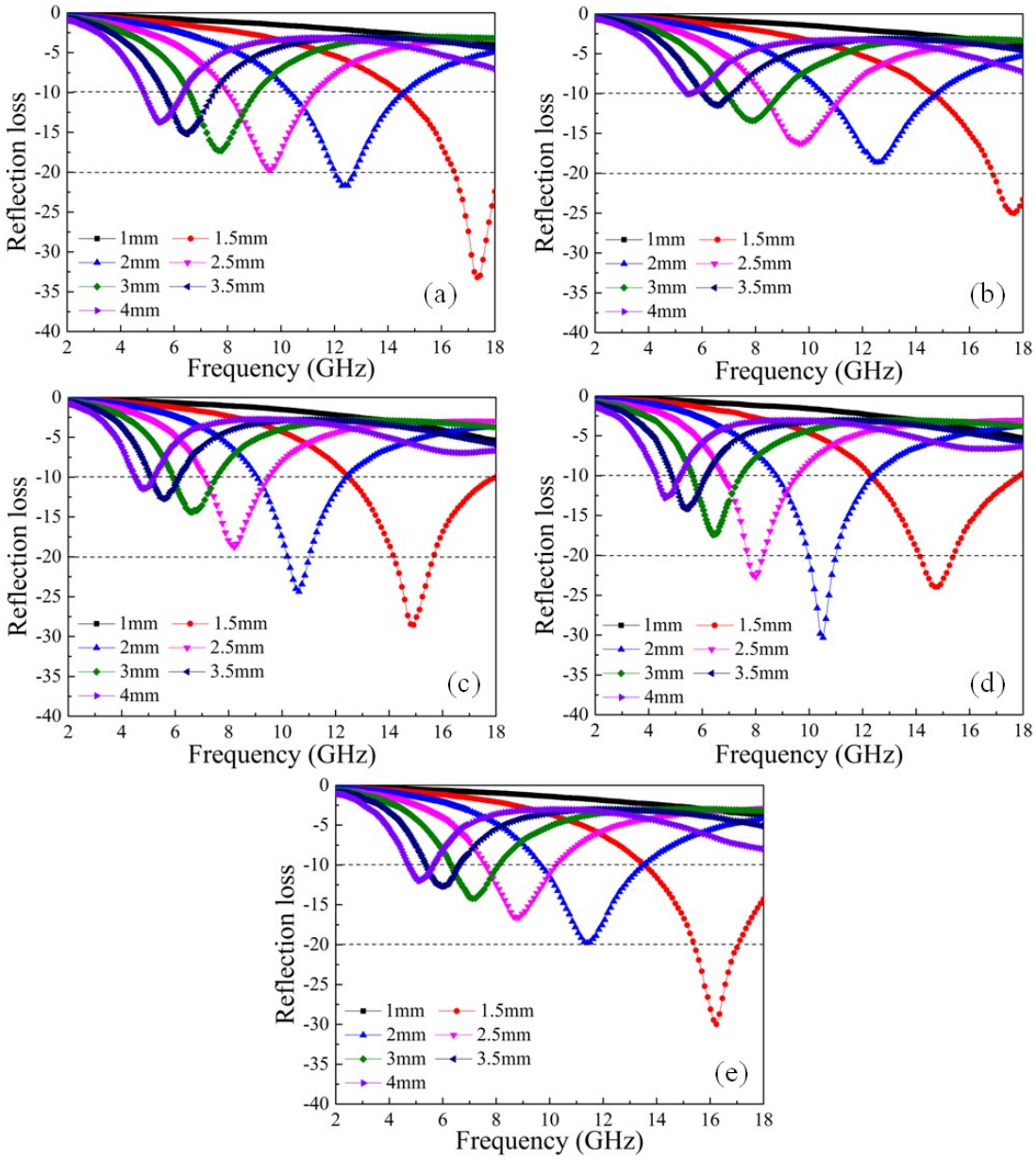

Fig. S4. Reflection loss of the as-annealed $FeCoNiSi_xAl_{0.4}$ (a-e for x= 0.1, 0.2, 0.3, 0.4, and 0.5) HEA powders in the frequency range of 2-18GHz.

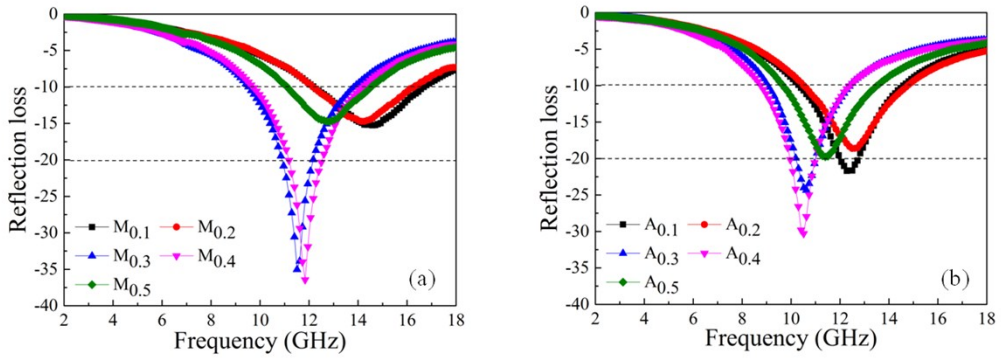

Fig. S5. Reflection loss of the as-milled (a) and as-annealed (b) $FeCoNiSi_xAl_{0.4}$ HEA powders for 2mm thickness. The position of absorption peaks agree with the change of dielectric constant.

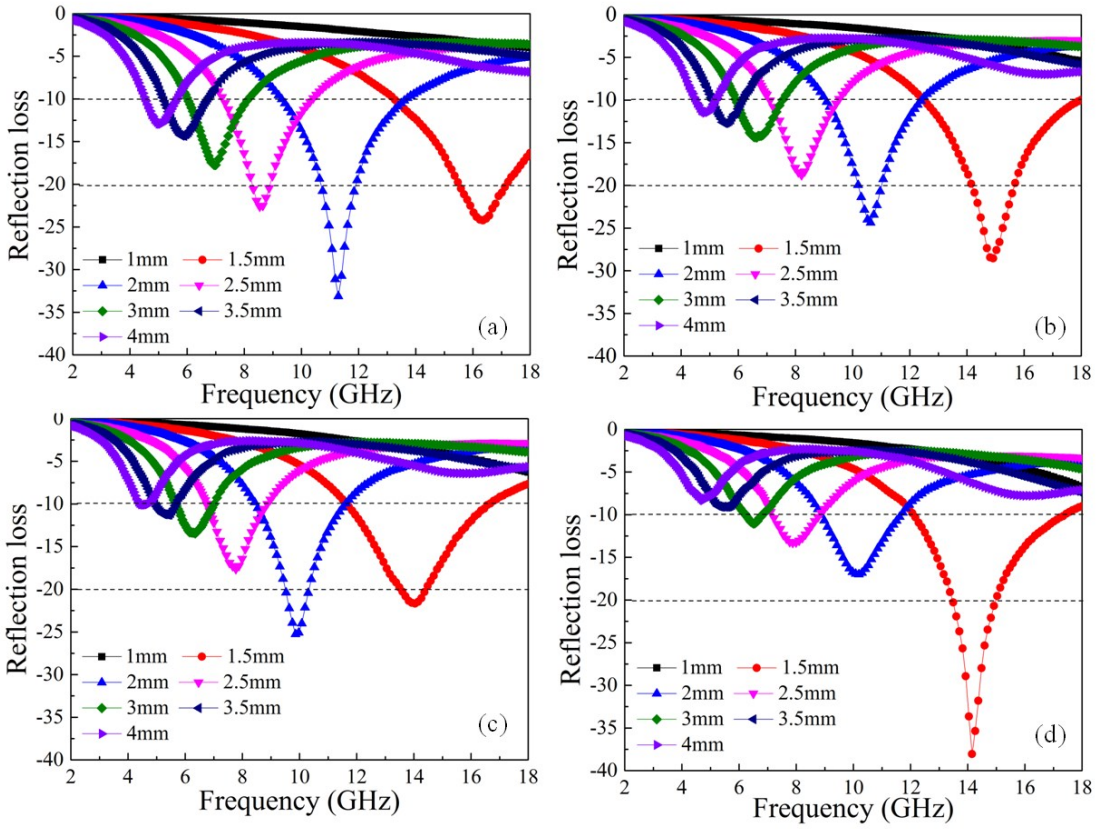

Fig. S6. Reflection loss of the as-annealed $FeCoNiSi_{0.3}Al_{0.4}$ (a-d for 573K-873K) HEA powders in the frequency range of 2-18GHz.

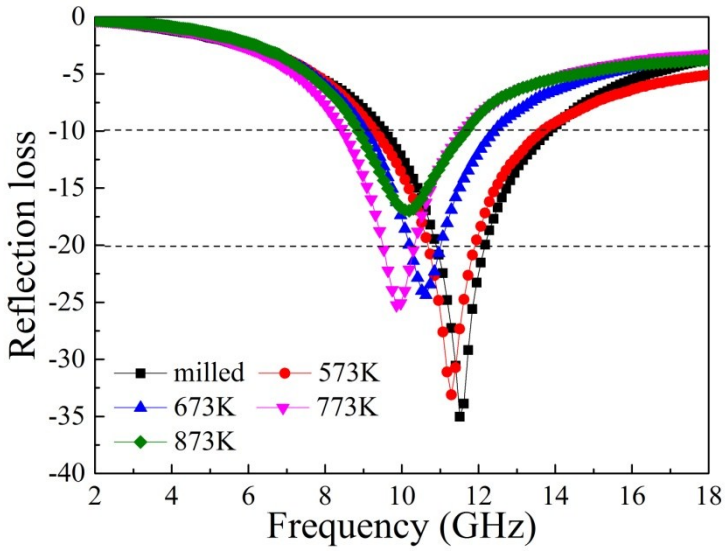

Fig. S7. Reflection loss of the as-milled and as-annealed (573-873K) $FeCoNiSi_{0.3}Al_{0.4}$ HEA powders for 2mm thickness. The position of absorption peaks agree with the change of dielectric constant.

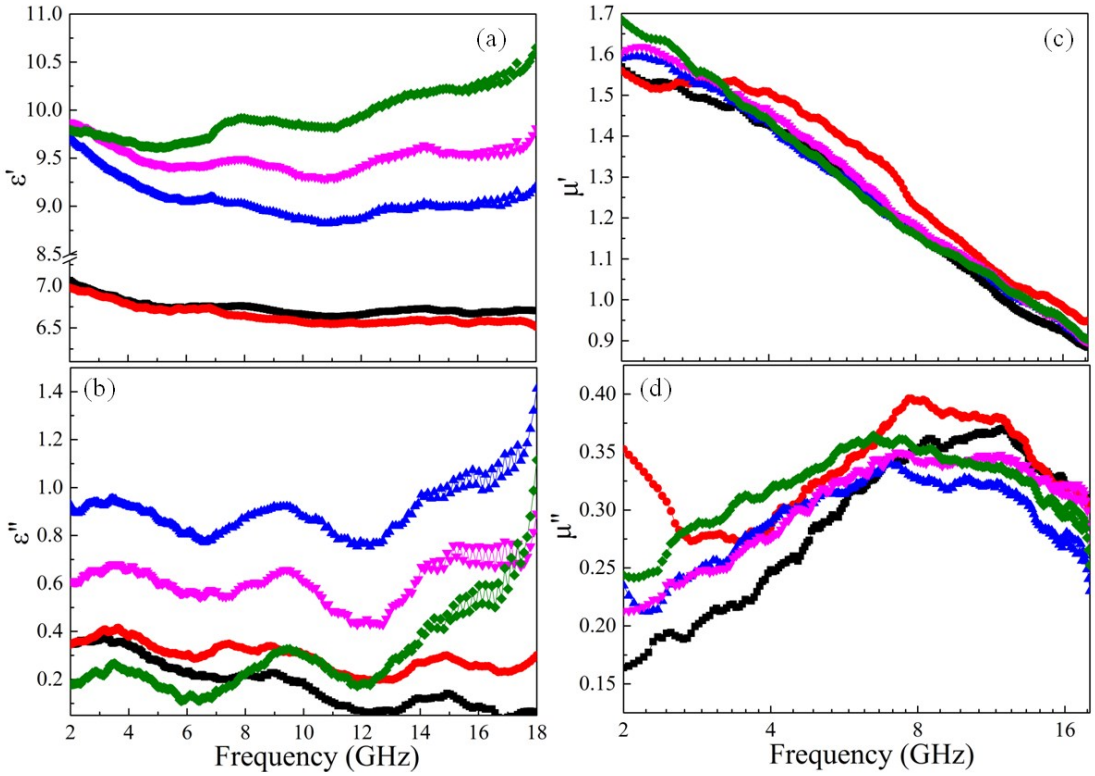

Fig. S8. Effects of annealing temperature on the (a-b) relative complex permittivity and (c-d) complex permeability for $FeCoNiSi_{0.1}Al_{0.4}$ alloy powders. The symbols of ■, ●, ▲, ▼ and ◆ denote the milled, 573K, 673K, 773K and 873K composites, respectively.

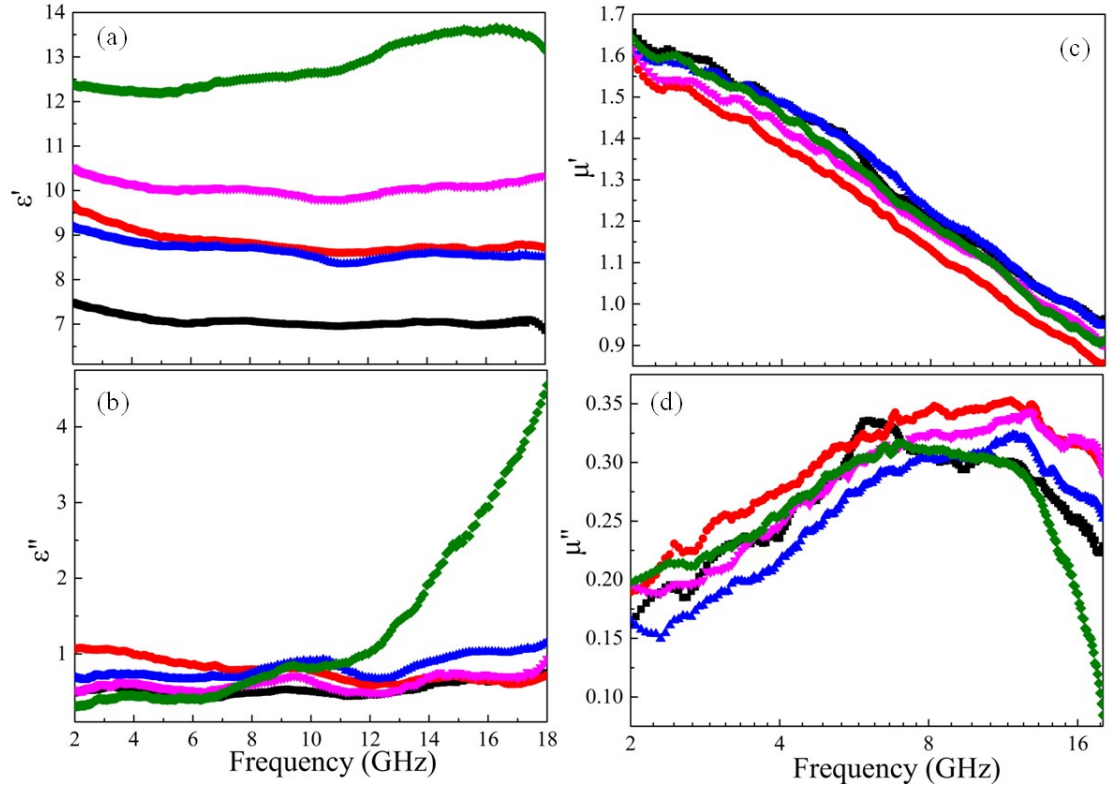

Fig. S9. Effects of annealing temperature on the (a-b) relative complex permittivity and (c-d) complex permeability for $FeCoNiSi_{0.2}Al_{0.4}$ alloy powders. The symbols of , , , and denote the milled, 573K, 673K, 773K and 873K composites, respectively.

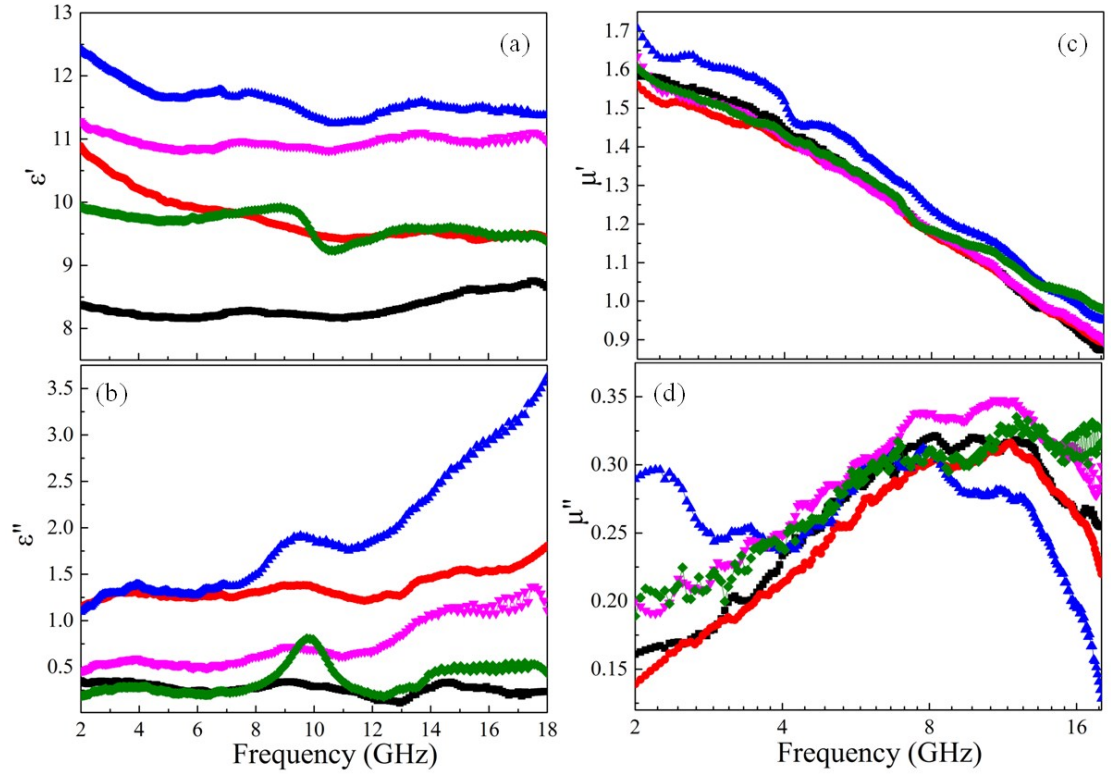

Fig. S10. Effects of annealing temperature on the (a-b) relative complex permittivity and (c-d) complex permeability for $FeCoNiSi_{0.4}Al_{0.4}$ alloy powders. The symbols of

, , , and denote the milled, 573K, 673K, 773K and 873K composites, respectively.

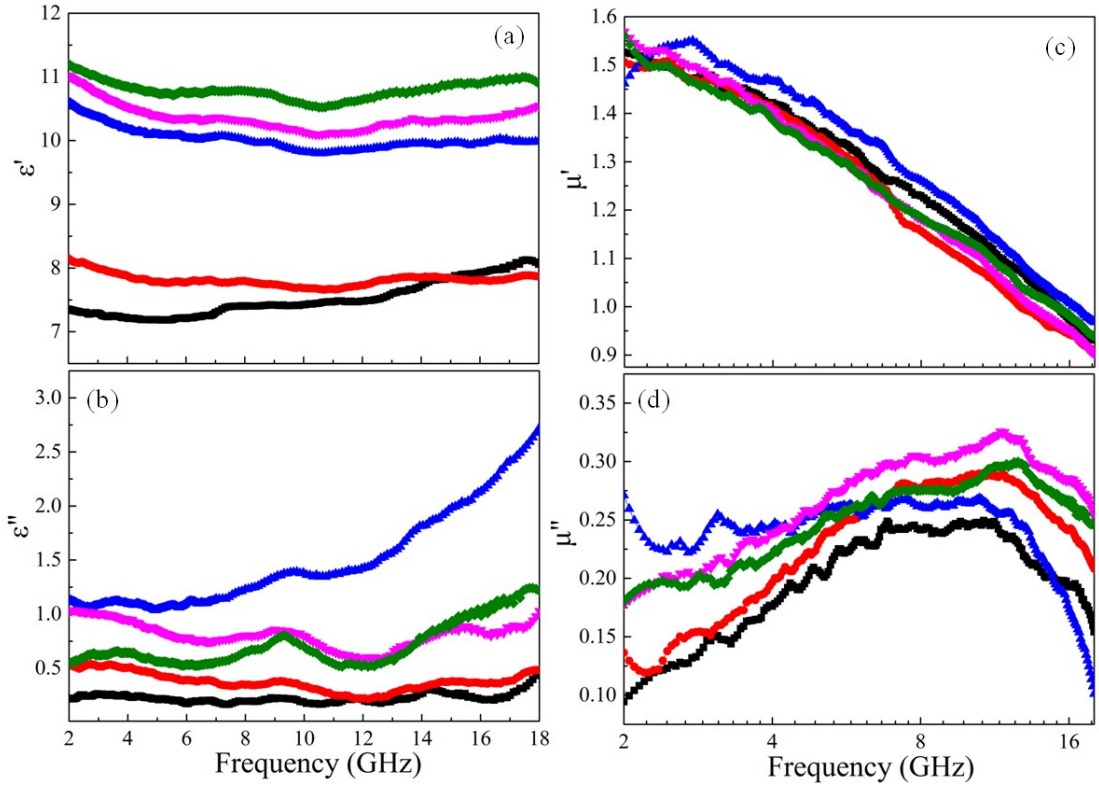

Fig. S11. Effects of annealing temperature on the (a-b) relative complex permittivity and (c-d) complex permeability for $FeCoNiSi_{0.5}Al_{0.4}$ alloy powders. The symbols of , , , and denote the milled, 573K, 673K, 773K and 873K composites, respectively.

Table S1. Effects of Si content on the conductivity of initial and annealed alloy powders.

Conductivity (S/cm)	0.1	0.2	0.3	0.4	0.5
initial	29.58	11.19	21.98	10.75	4.88
anneal-300℃	93.11	22.73	36.27	12.49	10.24
anneal-400℃	104.28	97.08	141.26	84.36	48.47
anneal-500℃	221.14	124.56	133.65	69.58	62.25
anneal-600℃	218.08	61.68	94.05	72.74	23.44