

## Nanostructure and paramagnetic behavior of NiZn ferrite spherical particle

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NiZn ferrite particles were prepared by ultrasonic spray pyrolysis with mixed solution of aqueous metal nitrates. It was presented that the advantage for homogeneous particle composition with single phase of spinel structure was shown and had good crystallinity of spherical morphology with nanostructured primary particles. The nano-porous structure of NiZn ferrite particle was observed by electronic microscopy and formed with nanosized primary particles of about 10 nm or less before annealing which was shown as paramagnetic behavior measured at 77 K and room temperature. The saturation magnetization was strongly affected by intraparticle size. It was also shown that NiZn ferrite particles exhibited the paramagnetic behavior with temperature due to thermal fluctuation of those nanostructured primary particles in magnetic spin moment disordering. The typical abnormal intraparticle growth like polyhedral primary particles was observed by annealing at 1,000°C with Zn-concentration dependency. Magnetic measurement with temperature revealed that NiZn ferrite particles showed relatively higher magnetization over 19 emu/g and coercivity over 550 Oe, respectively, at low temperature below 50 K due to its magnetic behavior of nanostructured primary particles as shown in Fig. 1. It can be well defined from the temperature- and relaxation time-dependent correlation[1]. Mössbauer studies were also presented that the NiZn ferrite particle as prepared before annealing showed the paramagnetic ratio about 44%, but normal ferrimagnetic structure after annealing at 1,000°C.

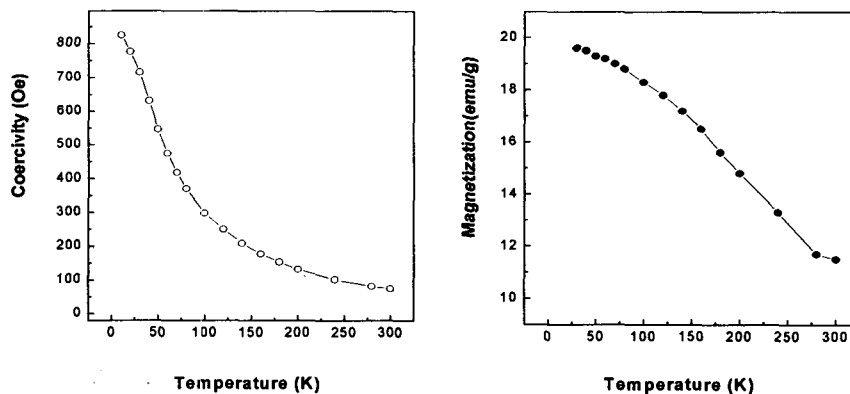


Fig. 1. Magnetic measurement of nanostructured NiZn ferrite powder.

### References

- [1] G. Bate, Ferrites : Proceedings of the ICF3 (Ed. H. Watanabe, S. Iida and M. Sugimoto), University Park, Tokyo, 509(1980).