What is nano materials

The precursor of Nano materials is amorphous ribbon(non-crystalline) obtained by rapid quenching at one million℃/second from the molten metal consisting of Fe, Si, B and small amount of Cu and Nb. These crystallized alloys have grains which are extremely uniform and small, "about ten nanometers in size". Amorphous metals which contain certain alloy elements show superior soft magnetic properties through crystallization. It was commonly known that the characteristics of soft magnetic materials are "larger crystal grains yield better soft magnetic properties". Contrary to this common concept, nano materials consisting of a extra small nana-order crystal grains have excellent soft magnetic properties.

Nano-crystalline material data base

Physical properties:

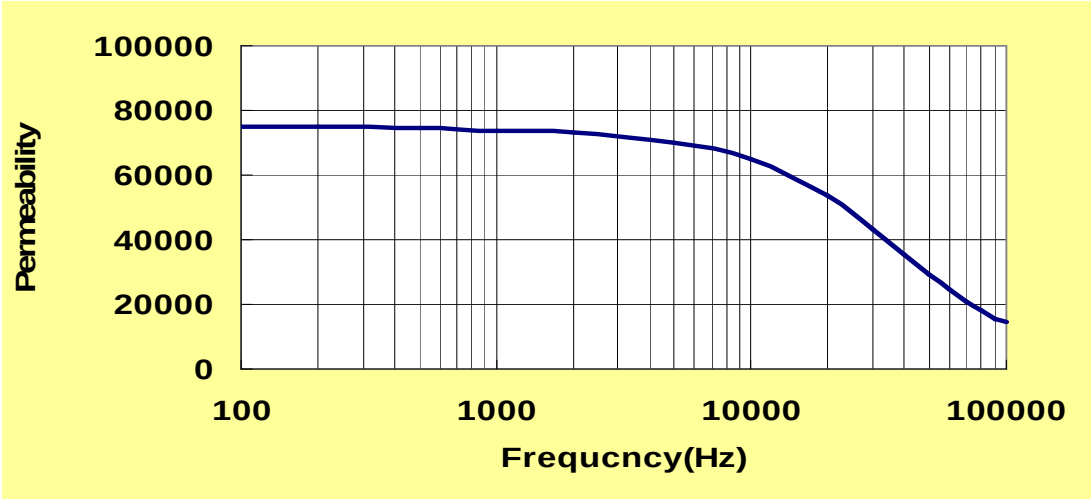
Initial permeability	10kHz	65,000
	100kHz	15,000
Saturation magnetic flux density, Bs (T)	20℃	1.23
	100℃	1.2
Residual magnetic flux density, Br (T)	20℃	0.62
	100℃	0.59
Coercive force, Hc (A/m)	20℃	2.5
	100℃	2.7
Curie Temperature, Tc (℃)		570
Saturation magnetostriction, λs ($x10^{-6}$)		~0.0
Electrical resistivity. ρ (μΩ • m)		1.2
Density, d (kg/m^3)		$7.3x10^3$

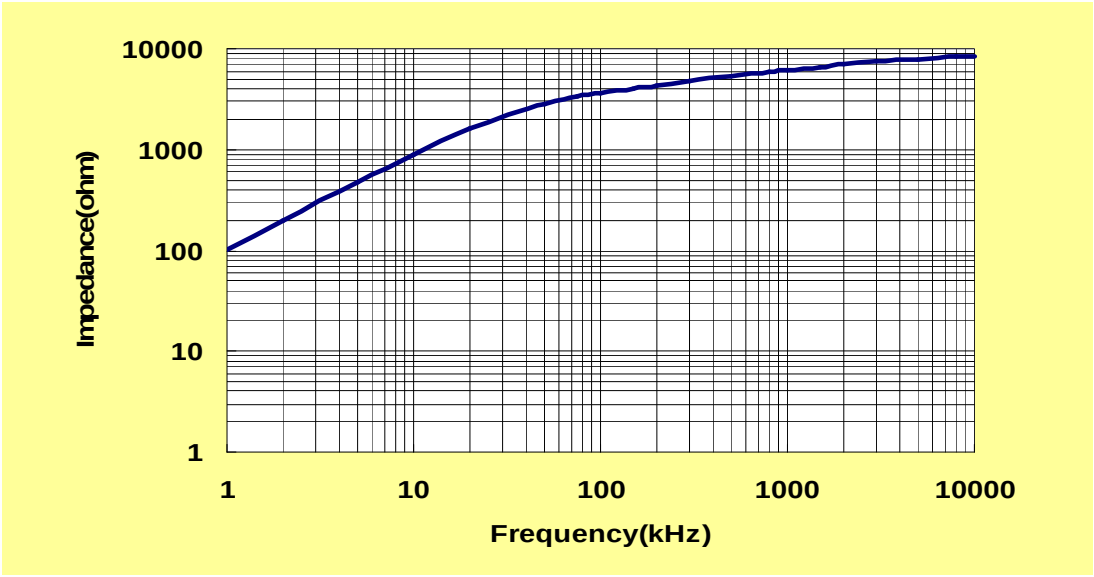
Features

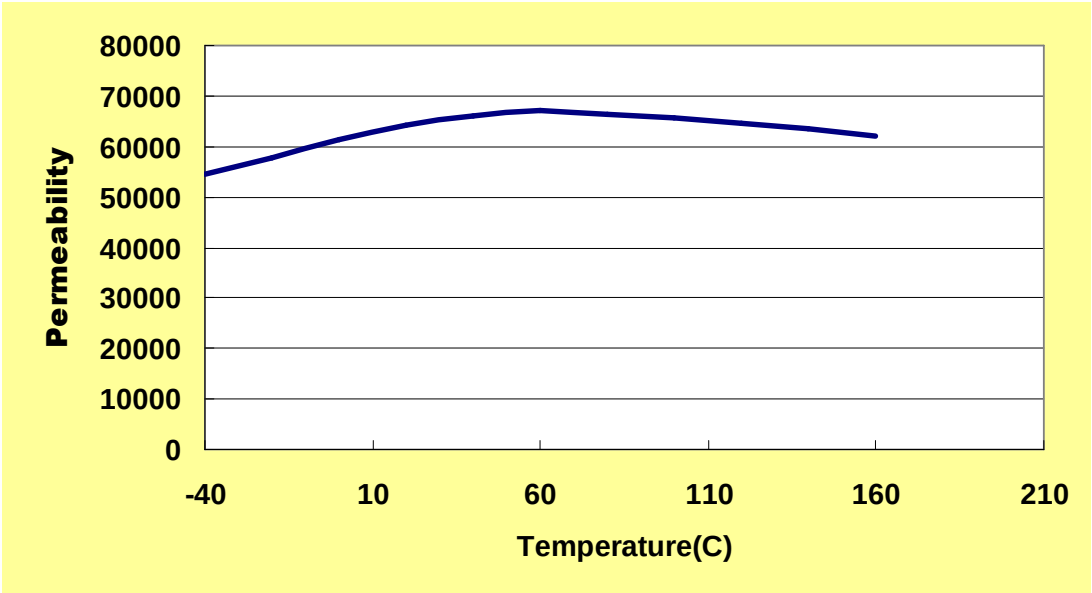
nanocrystalline have superior characteristics when compared with Mn-Zn ferrite. Those characteristics are as follows:

1) Having high permeability and low Q factor, nanocrystalline has higher impedance over a wide frequency range, which result in offering excellent noise suppression performance at wide frequency range. When nano and Mn-Zn ferrite have same inductance at 100kHz, nano show impedance two times higher than that of Mn-Zn ferrite. Furthermore, since nano require fewer windings to obtain the same inductance as Mn-Zn ferrite, Stray capacitance can be reduced and it allows higher impedance at higher frequency than 1 MHz.

2) Their frequency characteristics of impedance are not significantly affected by temperature change. As a result, it offers higher noise suppression effect over a wide temperature range.




10000
1000
100
10
1
Impedance(ohm)
1
10
100
1000
10000
Frequency(kHz)


80000
70000
60000
50000
40000
30000
20000
10000
0
Permeability
-40
10
60
110
160
210
Temperature(C)

Application

1) Mag-amp Transformer

Core size（mm）				Case dimension			parameters					
P/N	OD	ID	H	OD	ID	H	Ae(cm^2)	Le(cm)	V(cm^3)	Wa(mm^2)	Br/Bm	2¢m uwb
MA1005	10.4	7.4	4.5	12	5.5	7	0.055	2.79	0.154	23.7	＞94%	10.5
MA1205	12	10	4.5	14.7	6.0	6.7	0.036	3.45	0.127	28.2	＞94%	7.0
MA1205	11.5	8.5	4.5	14.7	6.0	6.7	0.055	3.14	0.173	28..2	＞94%	10.5
MA1205	12	8	4.5	14.7	6.0	6.7	0.073	3.14	0.231	28.2	＞94%	14
MA1303	13.5	10	3	15.7	7.4	6	0.064	3.68	0.238	42.9	＞94%	12.3
MA1505	15	12	4.5	17	8.0	7.1	0.055	4.23	0.234	50.2	＞94%	10.5
MA1505	14	10	4.5	17	8.0	7.1	0.073	3.76	0.278	50.2	＞94%	14
MA1805	18	12	4.5	19.5	10	6.7	0.110	4.71	0.521	78.5	＞94%	25

2) Wide band Transformers

Core (mm)				AL (μH) min.		Parameters					
P/N	OD Max	ID Min	H Max	10KHz 0.1V	100KHz 0.1V	Ae(cm^2)	Le(cm)	V(cm^3)	Wa(mm^2)	Hi-Pot	Coating
WB4*2*3	4.6	1.4	3.6	12	3.5	0.025	0.942	0.023	1.53	800V	Blue
WB4.5*2.5*3	5.1	1.9	3.6	9	3.0	0.025	1.09	0.027	2.83	800V	Blue
WB6*3*3	6.6	2.4	3.6	12	4.5	0.037	1.41	0.052	4.52	100V	Blue
WB7*3.5*3	7.6	2.9	3.6	15	4.0	0.043	1.64	0.07	6.6	1000V	Blue
WB7*3.5*4.5	7.6	2.9	5.1	18	5.5	0.064	1.64	0.106	6.6	1000V	Blue
WB8*5*4.5	8.7	4.4	5.1	18	4.0	0.055	2.04	0.112	19.6	1000V	Blue
WB9*5*4.5	9.7	4.4	5.1	20	4.5	0.073	2.19	0.162	19.6	1000V	Blue
WB10*6*4.5	10.6	5.4	5.1	18	4.2	0.073	2.5	0.185	28.2	1000V	Blue

3) Current Transformers

Core size	Case（mm）			V/A(mA/mV)		Parameter			
P/N	OD	ID	H	mA	mV	Ae(cm^2)	Le(cm)	V(cm^3)	Wa(mm^2)
CT13*9.5*4.5	14.3	8.4	6.6	10	//	0.064	3.53	0.22	55.3
CT19*14*6.5	22.8	12.0	8.8	10	//	0.33	5.18	0.69	113
CT19*14*8	22.8	12.0	10.3	10	//	0.164	5.18	0.84	113
CT20*14*8	22.8	11.8	9.9	20	//	0.196	5.33	1.05	109.3
CT20*14*10	22.8	11.8	11.9	20	//	0.24	5.33	1.31	109.3
CT21*15*10	23.6	12.7	12.8	20	//	0.24	5.65	1.39	126.6
CT21*16*10	24.8	13.7	12.5	20	//	0.20	5.8	1.19	147.3

4) Common Mode Choke

Core size	Case dimensions （mm）			AL(μH)			Parameters			
P/N	OD	ID	H	10kHz 0.1V	100kHz 0.1V	Tolerance	Ae(cm^2)	Le(cm)	V(cm^3)	Wa(mm^2)
CM12*8*4.5	14.7	6.0	7.1	28	5.4	**	0.073	3.14	0.231	28.2
CM15*10*4.5	17.0	8.0	7.1	27	4.9	**	0.092	3.92	0.362	50.2
CM16*10*8	18.2	8.3	9.9	50	8.2	**	0.196	4.08	0.803	54.0
CM19*14*8	22.8	12.0	10.3	32	7.4	**	0.164	5.18	0.849	113
CM20*12*8	22.6	10.4	10.5	55	13.4	**	0.262	5.02	1.31	84.9
CM20*12*10	22.6	10.4	12.5	60	14	**	0.328	5.02	1.64	84.9
CM25*20*10	27.7	17.8	12.9	28.4	7.3	**	0.205	7.06	1.44	248.7
CM25*16*10	27.6	13.7	12.6	65.5	14	**	0.369	6.43	2.37	147.3
CM26*20*10	28.7	17.8	12.9	32	7.8	**	0.246	7.22	1.77	248.7
CM30*20*10	33.2	17.9	13.3	59.3	13.6	**	0.41	7.85	3.21	251.5
CM40*32*15	44.5	29.2	18.6	47.2	//	***	0.49	11.3	5.56	669.3
CM40*25*15	45.0	21.4	19.9	95	18.2	**	0.92	10.2	9.4	359.4
CM40*25*20	45.0	21.4	24.9	110	//	***	1.23	10.2	12.5	359.4
CM50*40*20	53.6	37.0	22.8	45.3	//	***	0.82	14.1	11.5	1074.3

** +40/-25% *** +/-30% // not available