

تأثير زمن التلبيد على الخواص المغناطيسية للمركب $(\text{Ni}_{1-x} \text{Zn}_x \text{Fe}_2 \text{O}_4)$

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الخلاصة :

ZnFe_2O_4 (NiO ,ZnO , Fe_3O_4)
(, NiFe_2O_4)
($x=0.4,0.6$) $\text{Ni}_{1-x} \text{Zn}_x \text{Fe}_2 \text{O}_4$
1350 °c
[$\text{Ni}_{0.4} \text{Zn}_{0.6} \text{Fe}_2\text{O}_4$] (1)
(50 Hz) (2hr)

The effect of sintering time on the magnetic properties ($\text{Ni}_{1-x} \text{Zn}_x \text{Fe}_2 \text{O}_4$) for the syntheses

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ABSTRACT

By The Conventional Solid State reaction is used to prepared the (ZnFe_2O_4 , NiFe_2O_4) From the Oxide of (Fe ,Zn ,Ni) while had emphasized the Crystallize Synthesis accurately and Sort by these Synthesis by using the Technique (X.R.D) it is mixed to Formed the final Synthesis ($\text{Ni}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$) with ($x=0.4,0.6$) as a ring are sintered at (1350°c) for several tenses ,the Practical result of these Synthesis show the [$\text{Ni}_{0.4} \text{Zn}_{0.6} \text{Fe}_2\text{O}_4$] was the baste sample to use as core at low Frequency (50 Hz) N0.1

: _____

(soft ferrite)

$10^6 \Omega \text{cm}$

(Eddy Currents)

[1,2]

(Spinal)

Ni ,Zn ,Mg) [3,4]

M MFe_2O_4

(,Mn.....etc

(Transformer)

()

[5]

(Ni_{1-x} Zn_x Fe₂ O₄)

.

.

()

(Antenna)

(Chock Coil)

(Filters)

(Magnetic Amplifiers)

. [2,3,6]

:_____

MOFe₂O₃

(Anion)

(Cat ions)

Ni,ZnCd,Co,Mn,....)

M (MFe₃O₄)

Fe₃O₄

(

(FeO)

FeOFe₂O₃

[4]. (Ni_{1-x} Zn_x Fe₂ O₄)

(1 A°)

(M)

(0.83 A°) Zn

(0.74 A°)

. [4,5](1.05A°

)

)

(

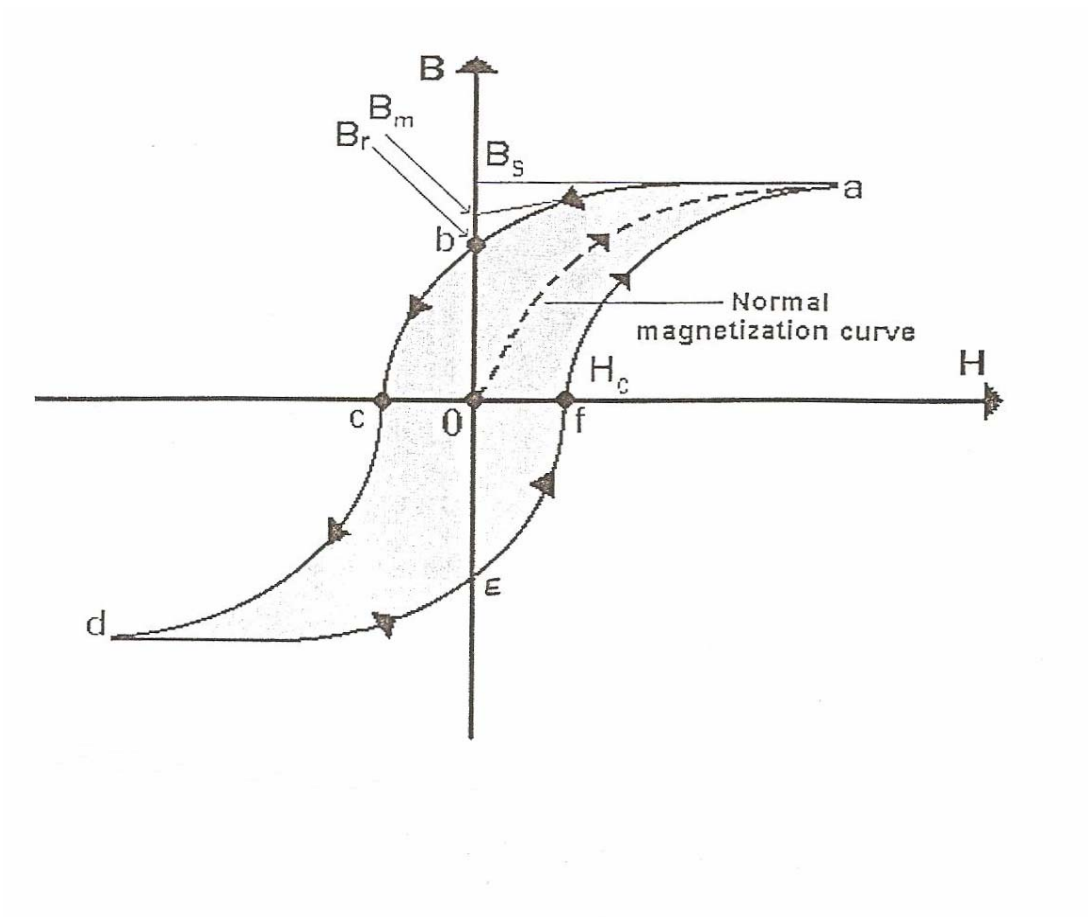
(7) , (H_C)

H

H

a

(1) oa



(8) () (1)

H

(oa) (ab) H B

(ob)

(Br)

(C)

(H_c) (oc)

(9) . (d)

(B_{max})

(0.5 A/m) (H_c) (B_r)

(10) .

(H_c)

. (B_r)

$(\text{Ni}_{1-x} \text{Zn}_x \text{Fe}_2 \text{O}_4)$

_____ : _____

(solid-state reaction)

(Zn-ferrite)

%98

(1:1)

(4hr)

(1100 °C)

(HERZOG)

(65)

.NiO , Fe₃ O₄

(Ni-ferrite)

(3)

-

(2)

(Spinal ferrite)

(XRD)

Ni_{0.4}Zn_{0.6}Fe₂O₄)

(Ni_{0.6}Zn_{0.4}Fe₂O₄ ,

(3 1000 °C)

, 48

%2

500 °C

(5°C)

(2,4,10,15)

(1350°C)

(10°C)

(600°C)

MAGNET-PHYSIK Dr. steingroener GmbH,KOIn 1998,2000,1512 / 98.

Test No. :REMACOMP C100A

(H_c)

(B_r)

(B_{max})

()

No		Br(T)	Hc (A/m)	B _{max} (T)	F(Hz)	
1	$\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$	0.055	5.1	0.293	50	2
2	$\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$	0.019	65.5	0.046	50	4
3	$\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$	0.105	50.8	0.157	50	10
4	$\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$	0.0008	4	0.011	30000	10
5	$\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$	0.106	58.5	0.151	50	15
6	$\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$	0.066	52.04	0.158	50	2
7	$\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$	0.079	16.8	0.169	50	4
8	$\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$	0.096	16.5	0.189	50	10
9	$\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$	0.093	14.7	0.188	50	15
10	$\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$	0.083	22.8	0.17	15000	15

: _____

($\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$, $\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$)

(x=0.4,x=0.6)

(2-a)

(2-b)

)

(2θ)

. (20° -50°)

(ZnFe_2O_4) (XRD)

(XRD)

(ZnFe_2O_4 , NiFe_2O_4)

(XRD)

(NiFe_2O_4)

(XRD)

(

(2θ)

(3-a)

(3-b)

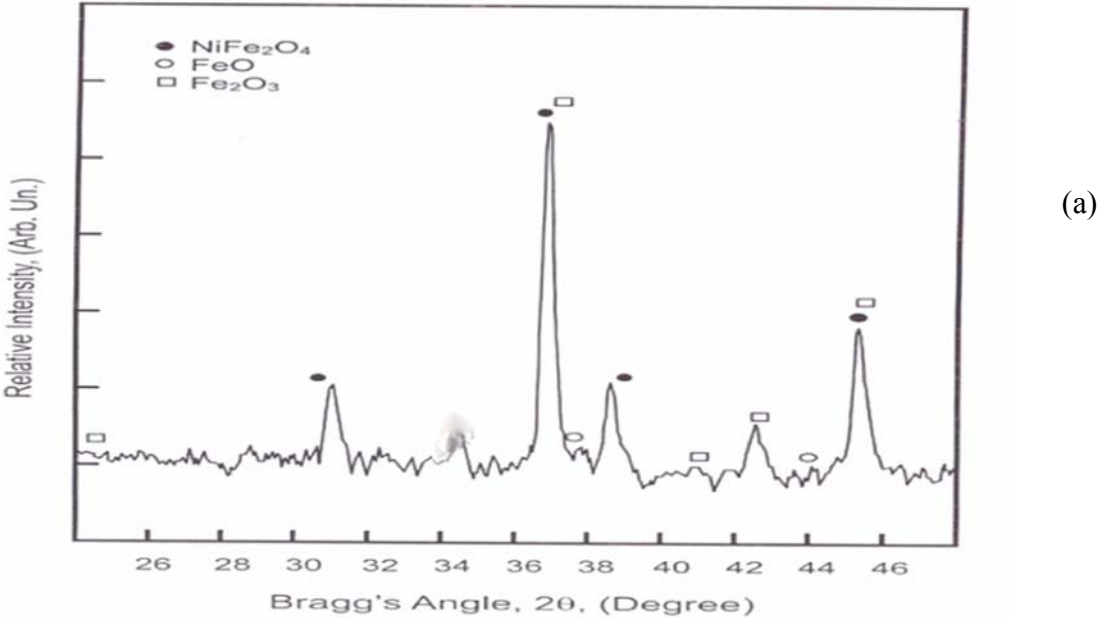
()

(Ni_{1-x} Zn_x Fe₂ O₄)			
		(2θ)	(2θ)
			(traces)
(4,5,6,7)	(x=0.6)		
(2,4,10,15)	(Ni _{0.4} Zn _{0.6} Fe ₂ O ₄)		
(H _c , B _r , B _{max})			
		(H _C)	
(B _{max} ,B _r)	2 hr	1350°c	(Ni _{0.4} Zn _{0.6} Fe ₂ O ₄)
	(H _c , B _r , B _{max})		1
10 hr		(8)	(50 Hz)
	(1)	(4)	(30000 Hz)
	(Ni _{0.6} Zn _{0.4} Fe ₂ O ₄)		(9,10,11,12)
	(1)	(6,7,8,9)	(2 ,4 ,10, 15)
			(H _c , B _r , B _{max})
		B _{max}	(10 A/m) (H _c)
			0.293(T) (1)
10 hr	(Ni _{0.4} Zn _{0.6} Fe ₂ O ₄)		(8,6)
	(4,3)	(1)	
	(Ni _{0.6} Zn _{0.4} Fe ₂ O ₄)		(12,13)
	(Ni _{0.4} Zn _{0.6} Fe ₂ O ₄)		
		(H _c , B _r , B _{max})	

		(X.R.D)	-1
	Fe ₃ O ₄ NiO Fe ₃ O ₄ ZnO		
	(Ni _{1-x} Zn _x Fe ₂ O ₄)		

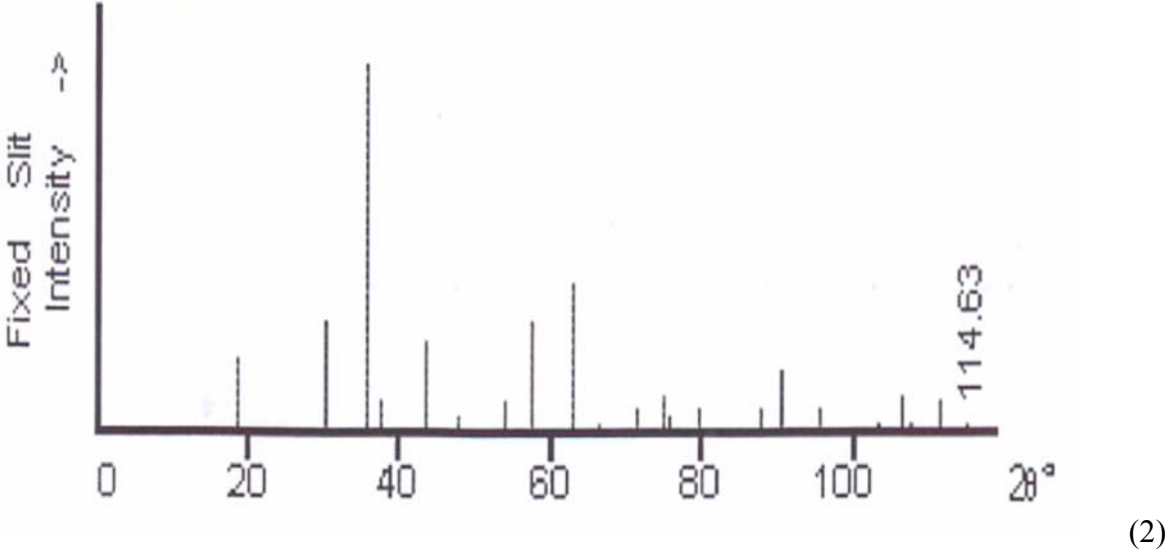
(B_{max} , B_r ,H_c) -2

2 Ni_{0.4}Zn_{0.6}Fe₂O₄ (1) 50

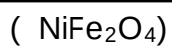
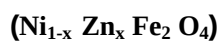


Ni Fe₂ O₄
Nickel Iron Oxide
Ref: Natl. Bur. Stand. (U.S.), Circ. 539, 10, 44 (1960)

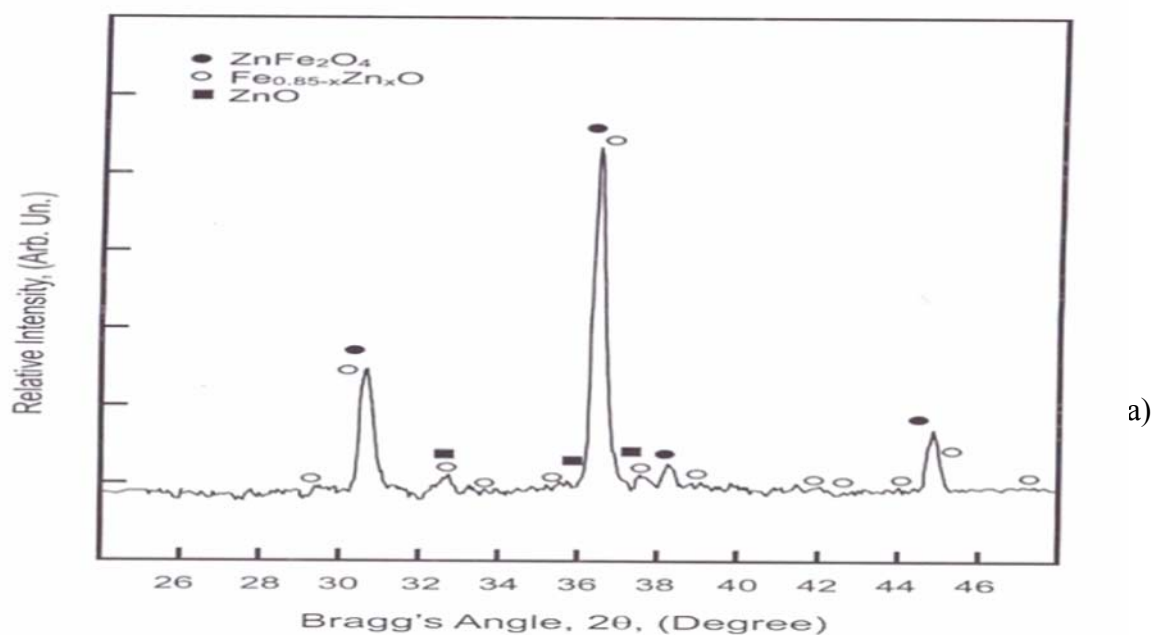
(b)



-a يمثل مخطط حيود الاشعة السينية للمركب (NiFe₂O₄) المحضر في البحث



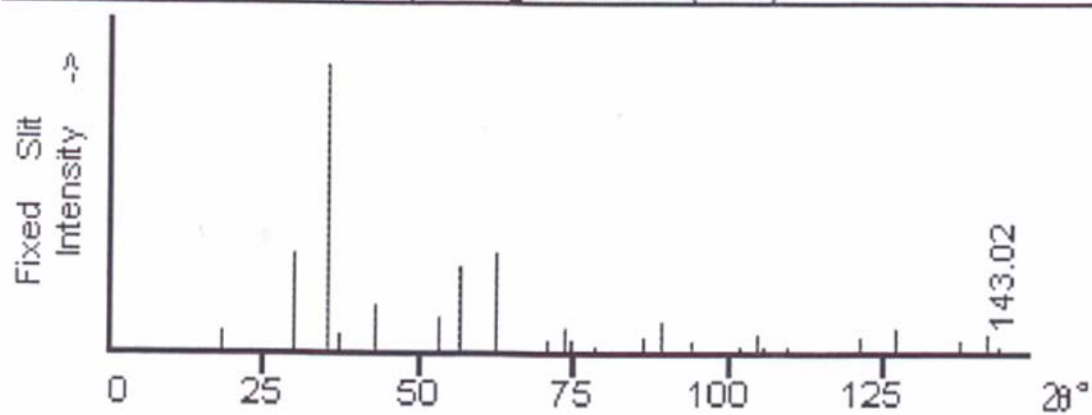
-b



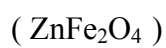
Zn Fe₂ O₄

Zinc Iron Oxide

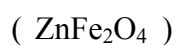
Ref: Natl. Bur. Stand. (U.S.) Monogr. 25, 9, 60 (1971)



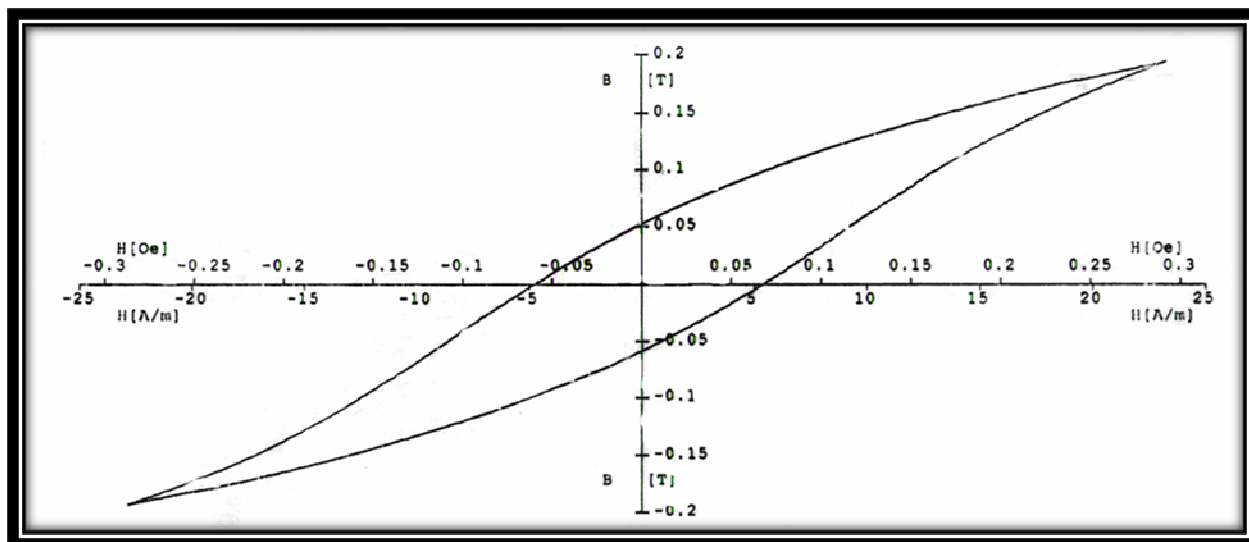
(3)



- a



- b

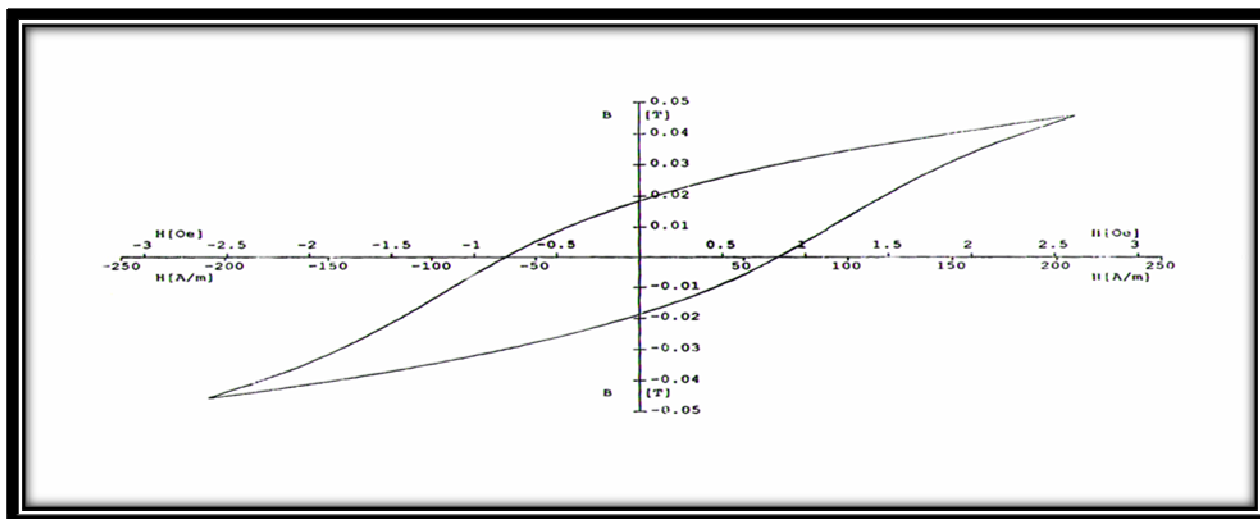


50

2

 $\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$

(4)

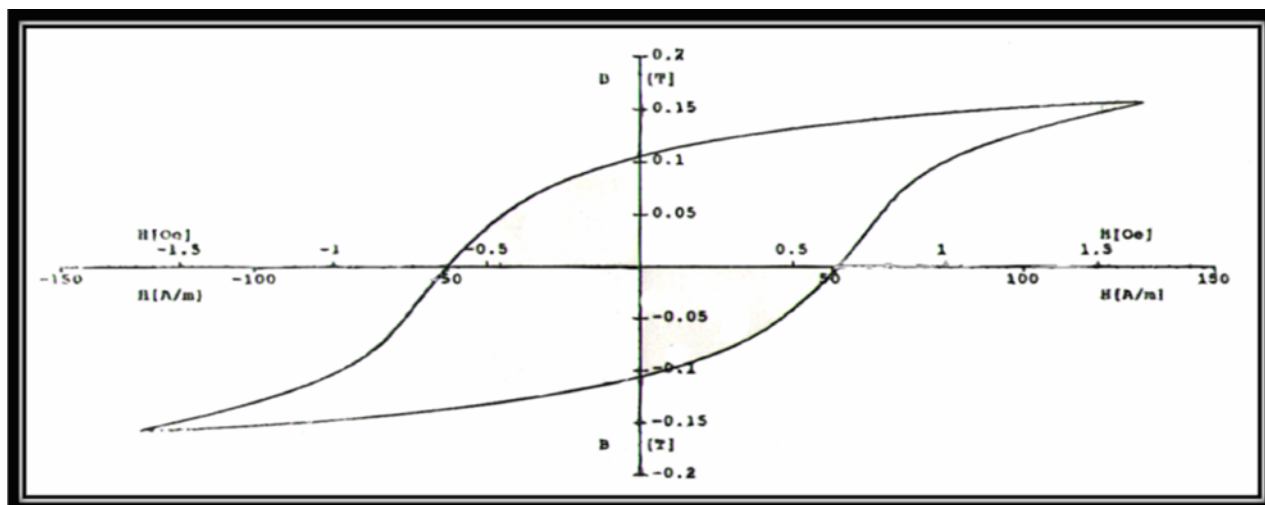


50

4

 $\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$

(5)

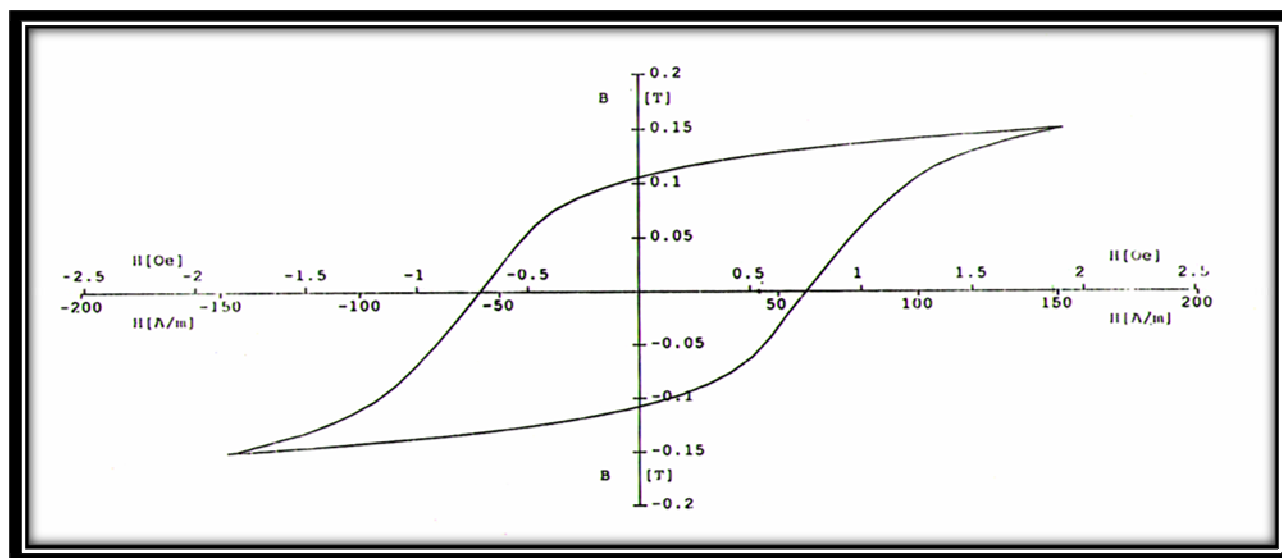


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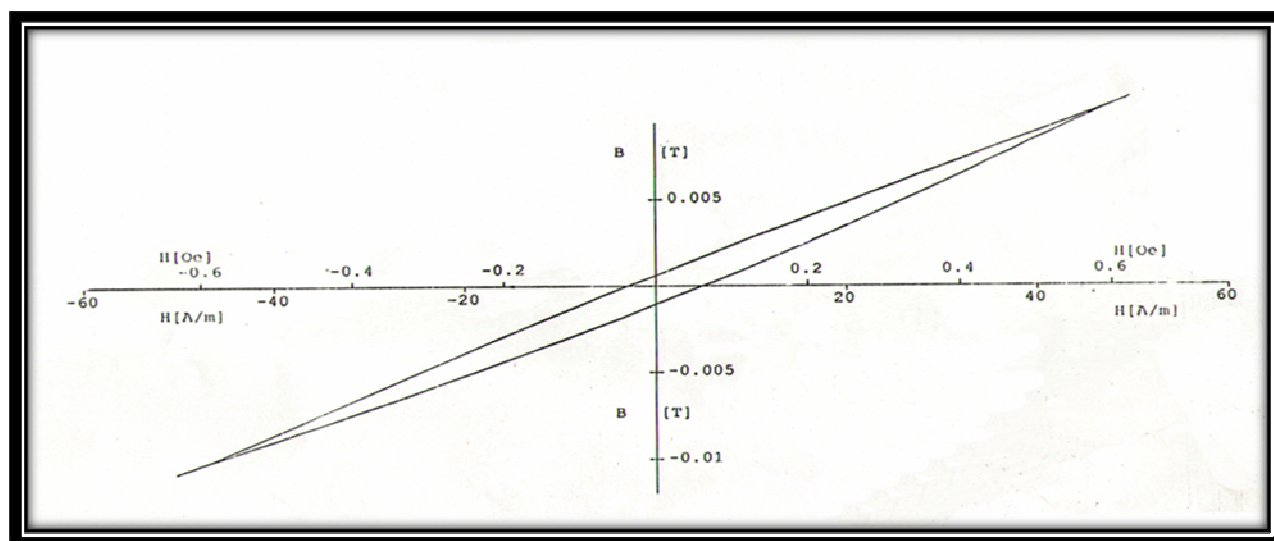
10

 $\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$

(6)

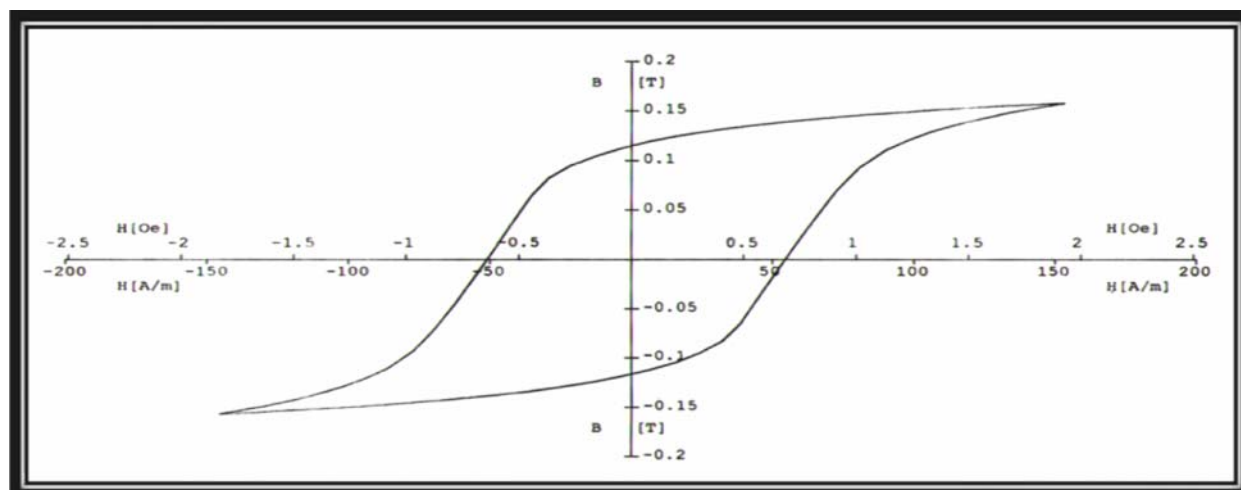


50 15 $\text{Ni}_{0.4}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$ (7)



10 $\text{Ni}_{0.4}\text{Zn}_{0.6}\text{Fe}_2\text{O}_4$ (8)

30000

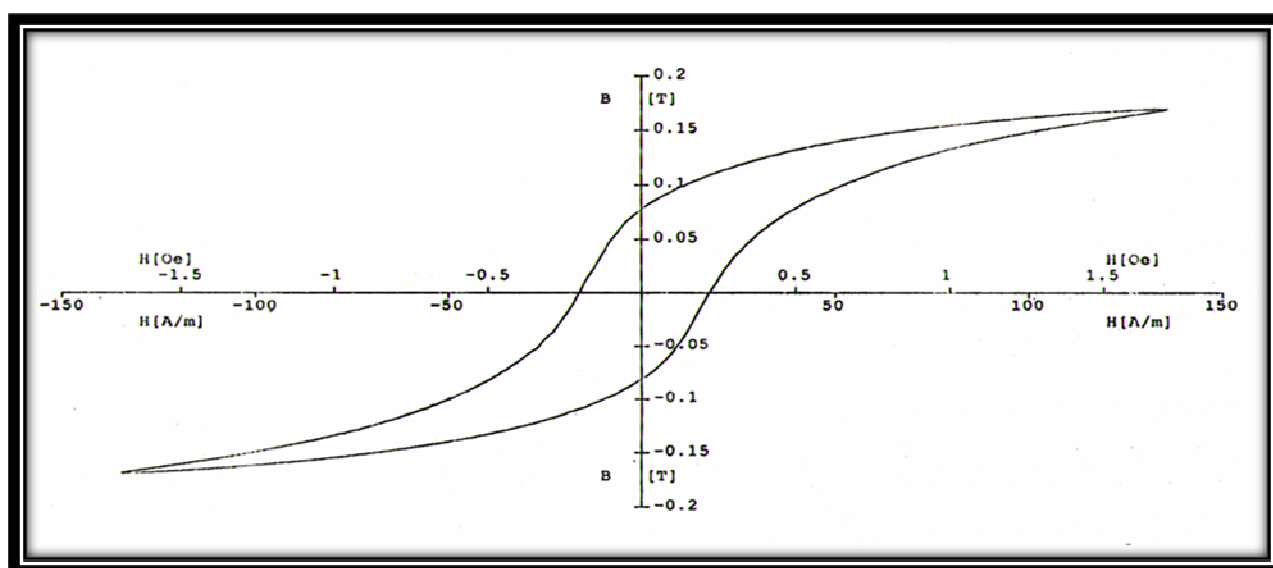


2

 $\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$

(9)

50

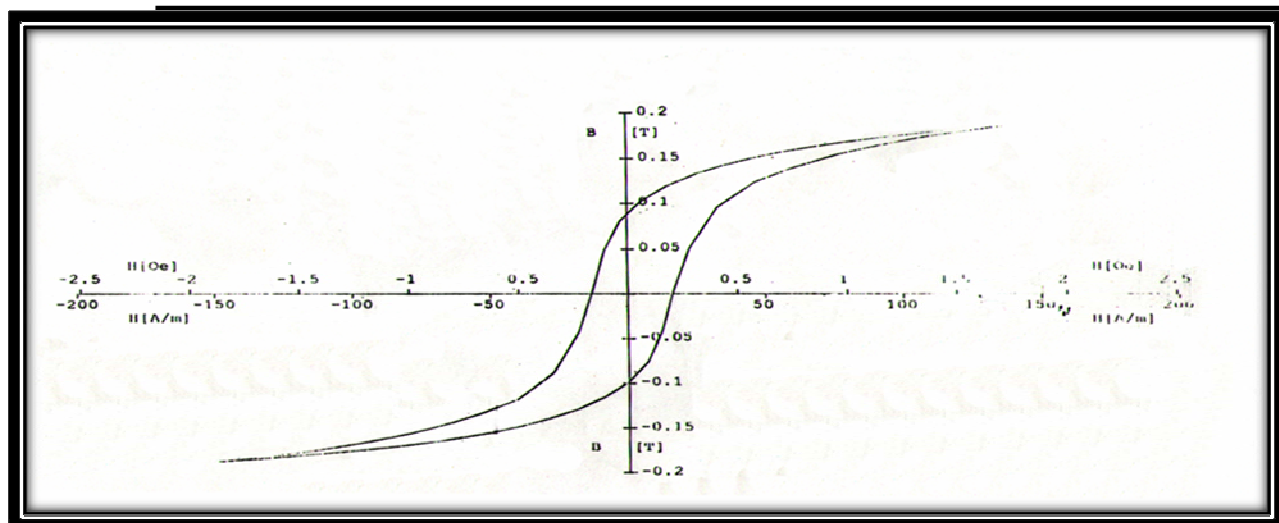
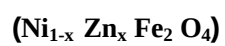


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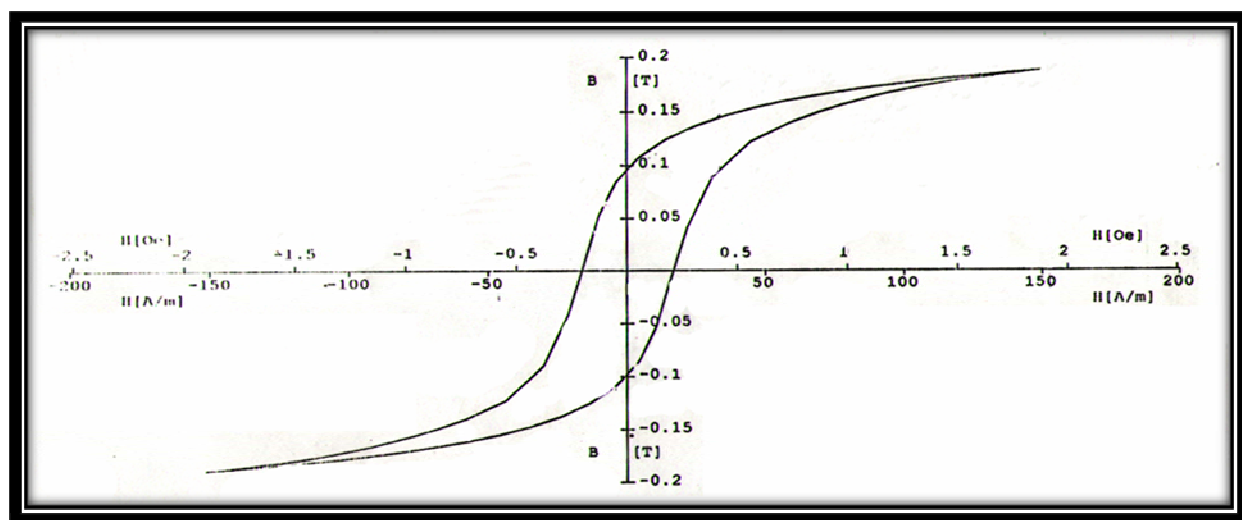
4

 $\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$

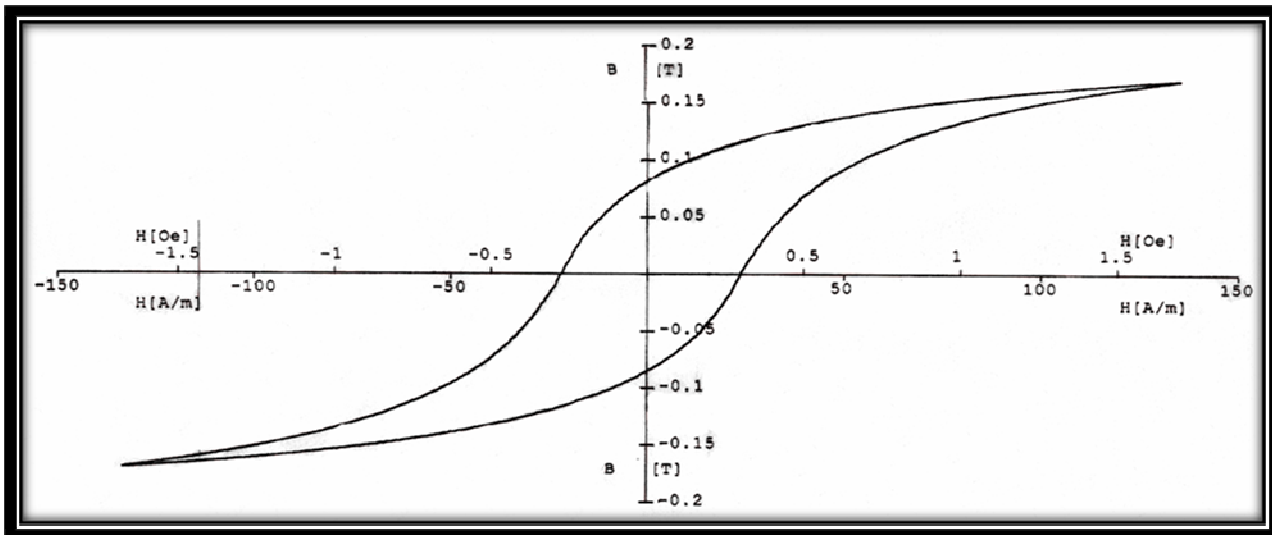
(10)



50 10 $\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$ (11)



50 15 $\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$ (12)



15000

15

 $\text{Ni}_{0.6}\text{Zn}_{0.4}\text{Fe}_2\text{O}_4$

(13)

Reference

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(Ni_{1-x} Zn_x Fe₂ O₄)

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