The Application of Permanent Magnets Materials in Electrical motors

Nawal Sabri, ghoutia naima sabri

University of Abou Bakr Belkaid, Tlemcen, University of Tahri Mohamed, Bechar, Algeria

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sabri_nm@yahoo.fr, nawnaw@

Abstract

This study concerns the permanent magnets and their applications in the electric motors. It treats the losses in these materials: losses in normal mode "loss of hysteresis" and in sinusoidal mode by using the formula of Steinmetz. This enabled us to know which are the desirable qualities of the permanent magnets to make them suitable for high power applications, such as motors, generators and power transformers. These magnetic materials have a great importance because they reduced the size of motors considerably and allow stepping motors to be developed with very high rotational accuracy which form the back bone of hard drives in computers.

The magnetic losses of ferrite PM are discussed for different samples. To minimize the losses in such materials, the choice of the frequency of operation is indispensable for two reasons:The fact that these losses depend of the frequencyand each sample of material has its own frequency band where it works with less loss.

References

[1] H. Lewis, F. J.Villacorta, “Perspectives on permanent magnetic materials for energy conversion and power generation”, The Minerals, Metals & Materials Society and ASM International, vol44A, pp. 2-20, Jan 2013.

[2] G.N.Sabri et al., “Magnetic materials for clean environment energy applications”, AWER Procedia Advences in Applied Sciences, Vol 1, pp. 989-995, 2013.

[3] Özgür *et al*., Microwave Ferrites, Part 1: Fundamental properties, *Journal of Materials Science: Materials in Electronics*, pp.14-15, 2009.

[4] Valenzuela, R. Novel Applications of Ferrites, *Hindawi Publishing Corporation*, *Physics Research International*, Volume 2012, p 2, 2012.

[5] M .Verite, « Etude de dépôts de ferrite pour dispositifs intégrés micro-ondes non réciproques », Thèse de Doctorat à l’université de Limoges, France, Soutenue le 14 novembre 2002, p.p 10-33.

Figures

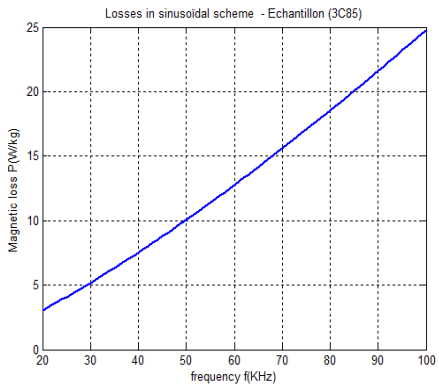

Fig.8 The magnetic losses versus frequency (3C85) at T=100°C.

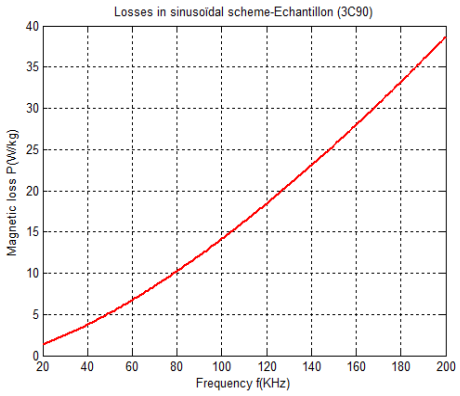

Fig. 9 The magnetic losses versus frequency (3C90) at T=100°C