

Core loss depending on magnetizing angle from easy axis in grain-oriented 3 % silicon-iron

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The reorientations of magnetic domains during magnetization are associated with basic magnetic properties, such as hysteresis loss, Barkhausen noise and magnetostriction[1-3]. The domain dynamics under an applied field depend on the angle between the H -field and [001] axis in (110)[001] grain oriented 3 % silicon iron.

In the present work, the core losses in grain oriented 3 % silicon iron are measured for various magnetizing angles with respect to the easy axis at frequency 50 Hz and 60 Hz.

The samples of dimensions 120 mm \times 15 mm \times 0.3 mm were prepared with the angle φ deviated from [001] axis in (110)[001] grain oriented 3 % silicon iron. The core losses were measured by single sheet method at induction 1.3 T[4].

Fig.1. shows the dependence of core loss in the magnetizing angle from [001] crystallographic axis when the induction is 1.3 T, and magnetizing frequency are 50 Hz and 60 Hz. As shown in Fig.1, the core loss increased to near 70° and decreased. This result is very similar to the work of A.J. Moses[5].

The ac hysteresis loss changes by complex magnetic domain in grain oriented 3 % silicon iron as the zig-zag domain when the magnetizing angle increases from [001], resulting in closure domain along $\pm [100]$ and $\pm [010]$.

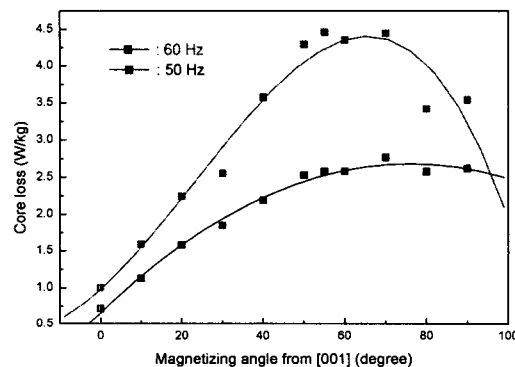


Fig.1. Dependence of core loss in the magnetizing angle from [001] direction.

References

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