Table 3 The linear regression coefficients R^2 for the cases with different magnetizing frequencies

	$R^2(H_c)$	$R^2(W_L)$	$R^2(B_{max})$	$R^2(b_1)$	$R^2(b_3)$	$R^2(b_3/b_1)$
2Hz	0.0682	0.5051	0.9654	0.9607	0.8845	0.7581
6Hz	0.0000	0.5769	0.9655	0.9612	0.8807	0.7201
10Hz	0.2184	0.6560	0.9673	0.9615	0.8687	0.6576
14Hz	0.2579	0.6701	0.9662	0.9623	0.8648	0.6100
18Hz	0.4672	0.7016	0.9652	0.9627	0.8450	0.5056

3. Conclusion

In this work, the magnetic hysteretic loops measurement technique was employed to characterizing the residual plastic strain occurred in low carbon steels. The reliability of magnetic parameters were studied and the influence of frequency of the applied magnetic field on the sensitivities of magnetic parameters were analyzed. It is found that under the conditions of the tested different magnetizing frequencies, the parameters of B_{max} and b_1 demonstrates linear dependency on the residual plastic strain of ε_p. The eddy current loss and anomalous loss will generated when the magnetizing frequency increase, which will directly affect the coercive force H_c and hysteresis loss W_L. However, the maximum magnetic flux density B_{max} is insensitive to the eddy current loss and anomalous. Furthermore, the magnetic properties is determined by the microstructure of the material, The change of microstructure with different residual strain need to further study to explain the change of magnetic parameters.

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