

FOREWORD



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Today, the problem of the global environment is an important technical task which has attracted great interest in many fields, particularly in the industrial world. In order to protect the environment and create a society with the potential for sustained growth, it is imperative that both business enterprise and the ordinary citizen play some type of role.

In particular, high priority has been placed on measures to prevent global warming as a response to the global environmental problem. Because a reduction in CO₂ emissions is a necessary countermeasure against global warming, technical development and the establishment of laws aimed at expanding the use of petroleum-substitute energy sources are now being promoted. However, energy saving is also an effective indirect means of reducing CO₂ emissions. Although much has been accomplished in this area over the years, further efforts are now required more than ever from the viewpoint of preventing global warming. Moreover, in order to promote energy conservation as a realistic environmental countermeasure, thinking which minimizes the cost of such measures is indispensable. Thus, efforts to use our limited energy resources efficiently and to minimize costs will both become increasingly important in the future.

This special issue, which is devoted mainly to electrical steel, discusses the grain-oriented and non-oriented electrical steel sheets which are produced by Kawasaki Steel. These are important functional materials which are used principally in the cores of transformers and rotating machinery. It is possible to make a direct contribution to energy saving by further improving the quality of these products and by enhancing the efficiency of the equipment in which they are used.

Kawasaki Steel began producing cold-rolled non-oriented electrical steel sheets in 1954 at its Fukiai Works (as its plant in Kobe was called at the time), and began industrial production of grain-oriented electrical sheets in 1961. Since that time, the company has consistently made every possible effort to improve the magnetic properties of its products and the easiness in actual use at customers. Thus, in effect, we have been working to solve the global environmental problem for many years.

Recently, the bipolar tendency in the requirements placed on electrical steel has become increasingly clear. What this means is that, on the one hand, there is an orientation toward higher-grade products, in which energy saving, low noise, and other functions are strongly demanded, while on the other hand, there is also an orientation toward economy, in which customers are willing to tolerate some compromise in performance in return for lower prices. In this special issue, we have decided to present a summary which touches on both tendencies, emphasizing the trend toward higher-grade products in the area of grain-oriented electrical sheets and the actual situation of bipolarization and development aimed at higher functionality in the area of non-oriented sheets.

Although Kawasaki Steel began manufacturing electrical steel sheets at Fukiai Works, the company drew up a plan in 1985 to transfer electrical steel production to Mizushima Works in order to achieve more efficient production at an integrated steel works. The relocation and new construction of all the production equipment for non-oriented and oriented electrical steel sheets was completed

in 1995. The completion of this work provides an appropriate occasion for this special issue on electrical steel, which describes the history of technical development, recent technical topics, and the main electrical steel products of Kawasaki Steel.

Although it is sometimes said that electrical steel represents the culmination of steel technology, the development of this product and technology is still far from complete. Kawasaki Steel has responded to such technical challenges with fresh creativity throughout its history to date, and we are therefore confident that we can contribute to the society of the 21st century by developing the materials which the times require.