

FOREWORD

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Since JFE Steel Corporation was launched in 2003, great changes have occurred in both the steel industry itself and its surrounding environment. When JFE Steel was established, in addition to the synergistic effects of the consolidation of two of the world's largest steel companies, the new company also enjoyed a strong tailwind in the form of expanding global demand for steel products, and achieved excellent results. However, the following years saw the collapse of Lehman Brothers in 2008 and the Great East Japan Earthquake in 2011, which was a natural disaster of an unprecedented scale. More recently, the company has been placed under a difficult market environment as a result of the growing gap between supply and demand and the drop in steel prices due to a slowdown in steel demand.

Moreover, in the steel industry, JFE Steel has also been exposed to increasingly intense competition due to the consolidation of competitors in Japan and other countries, as well as a flood of Chinese steel manufacturers, which number as many as 500 companies.

In order to supply high quality products to customers in this difficult environment, development efforts in the steelmaking process have emphasized production of high quality steel at low cost. At the same time, JFE Steel is also actively developing environment-friendly processes for energy saving and waste reduction, aiming at coexistence with the global environment, which is also demanded by society.

This "Special Issue on Steelmaking," which is the first since the establishment of JFE Steel, introduces especially noteworthy examples of the steelmaking technologies developed by JFE Steel in recent years. In the area of productivity improvement, which contributes to lower costs, efforts in each process are introduced. The technologies described in this connection include high efficiency dephosphorization and desulfurization in the hot metal pretreatment process by introduction of new technologies, represented by DRPTM, a reaction and stirring control technology for stable converter operation, an oxygen blowing technology for high speed treatment in secondary refining, and a secondary cooling technology for high speed casting in continuous casting process. In addition, an outline of the newly-introduced converter and continuous casting machine at West Japan Works-Fukuyama District is also

presented. In the area of high quality steel, the technologies introduced here were developed with the aims of reducing residual inclusions in steel and centerline segregation in cast slabs, which cause defects in steel products, by stirring control in secondary refining and molten steel flow control in the mold during continuous casting. As environmental technologies, in addition to energy saving-type processes and refractory technologies, this Special Issue also introduces technologies for use of scrap, which contributes to CO₂ reduction, and for reduction of generation and recycling of slag, which is a byproduct of the steelmaking process. Measurement and simulation techniques which support these technologies are also introduced.

These technologies represent the fruition of continuing technology development efforts spanning many years. In the future, JFE Steel will continue its efforts to realize its Corporate Vision of “Contributing to society with the world’s most innovative technologies” by actively promoting the development of steelmaking technologies. To achieve this goal, we request the further guidance and encouragement of all those concerned.