Remarks on Special Issue on Stainless Steel

Naoto HIRAMATSU
Director, Member of the Board Managing Executive Officer
Nippon Steel Stainless Steel Corporation

Stainless steel has an industrial history of approximately 100 years, which is young compared to other steels. However, recently it has undergone some radical changes. In Japan in April 2019, Nippon Steel Stainless Steel Corporation was established as one of the members of the Nippon Steel group, which is the largest stainless steel company in Japan manufacturing sheets, plates, bars, and wire rods. Outside Japan, China's crude stainless steel production in 2019 reached an all-time high of 29.4 million tons. This output is more than double what it was ten years ago and exceeds half that of the global stainless steel production. Due to this volume, China has started to have a major influence on the stainless steel market.

Looking at the market, while stainless steel is becoming a conventional material as a result of mass production, developing applications with high added value stainless steel is becoming increasingly important. New applications include the demand for materials that are suitable for the next-generation automobiles and social infrastructure and other various sectors to satisfy environmental regulations. In addition to corrosion resistance, which is a basic characteristic of stainless steel, other various properties such as high strength, heat resistance, non-magnetic property, and workability are studied as added values. Since chromium and nickel, which are basic chemical compositions of stainless steel, are rare metals, the use amounts of these metals need to be reduced to save costs and resources. Furthermore, Nippon Steel Stainless Steel has been developing various materials such as low-chromium stainless steel with improved corrosion resistance by small amounts of elements and resource-saving stainless steel by controlling the microstructure (e.g., ferrite-austenite duplex stainless steel). They have been applied to provide solutions to our customers.

Conventionally, stainless steel contributes to enhancing the values of existing goods by providing lighter weight and longer life. Stainless steel is now expected to further contribute to developing new goods. To that end, continuing steady research and development is more important than before, and developing processing technologies that make it possible to manufacture stainless steel with high specifications is also important.

With the remarkable advancement of digital technologies, industrial technologies have also been advanced and the use of AI is under discussion. In the steel industry, the analysis technologies used in research are at the nano level. It can be said that nowadays research is greatly indebted to these high-level technologies. However, I think that the outputs of research and development depend on the consistent observations of phenomena by the engineers with their experience and expertise.

This issue introduces some of the latest studies on stainless steel at the Nippon Steel group and development of manufacturing technologies along with various types of high-functionality and resource-saving stainless steels that are widely used to provide customer solutions. I hope this issue helps you to obtain a better understanding of stainless steel.