Blast Furnace and Iron Production

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Introduction

A blast furnace is a type of metallurgical furnace used for smelting of metallic oxides, generally iron.

In a blast furnace, fuel and ore are continuously supplied through the top of the furnace, while air (sometimes with oxygen enrichment) is blown into the bottom of the chamber. As the air passes through the furnace, it reacts with the carbon in the fuel to produce hot reducing gases that flow up through the ore, causing the iron oxide to react. This process produces hot liquid iron, which is drawn off at the bottom of the furnace.

Ancient Blast Furnaces in China

The oldest known blast furnaces were built in ancient China by the Han Dynasty (206 BC-220 AD). By the 1st century AD, the Roman Empire was using similar technology. In China, iron was one of the most important metals, and blast furnaces were used to smelt iron ore into iron.

Modern Furnace

The modern blast furnace is the most efficient and widely used type of blast furnace. It is characterized by a higher operating temperature, smaller size, and increased production capacity.

Near Term Scenarios

Near-term scenarios through 2020 or 2030 of future greenhouse gas emissions have been developed by EPA and the Department of Energy (DOE).

- EPA has developed transcarbon dioxide (trans-CO2) greenhouse gas emission projections for both the U.S. and internationally through 2020.
- Global non-CO2 greenhouse gas emissions are projected to grow 44% to 53 billion metric tons-CO2 equivalent by 2030.
- According to the projections, China will be the largest contributor, followed by India.

Future Atmosphere Changes in Greenhouse Gas and Aerosol Concentrations

The extent and speed of future atmospheric changes will be driven by the level of greenhouse gas and aerosol emissions over time. Human activities are major sources of these emissions, and it is expected that the concentration in the atmosphere will continue in the future, although the U.S. and other governments are taking steps to reduce emissions.

Carbon dioxide concentrations (see Figure 20) in the atmosphere will remain throughout the 21st century according to all IPCC scenarios. The scenarios project CO2 concentrations ranging from 355 to 903 parts per million by 2100, which is 1.1 to 1.5 times the pre-industrial level.

Conclusion

Iron production plays an important role in daily life and economy. Modern technology has greatly improved the efficiency of iron production. However, greenhouse gas emissions remain a serious problem. Future efforts to reduce iron production and emission of iron recycling are essential for sustainable development.

References