Contribution ID: **20** Type: **Oral Presentation**

Development of Low-Carbon Blast Furnace Operation Technology through Scrap Utilization and EDEM Simulation

Tuesday 12 May 2026 16:30 (20 minutes)

Carbon reduction has recently emerged as a critical global issue, prompting many companies to implement measures to lower their emissions. In Korea, the steel industry accounts for approximately 39% of industrial carbon emissions, with blast furnace operations responsible for about 82% of that share. Consequently, effective carbon mitigation in the steel industry requires the development and application of low-carbon blast furnace technologies. POSCO is pursuing such technologies in parallel with the HyREX process, focusing not only on the use of biomass and hydrogen but also on carbon-reducing raw materials. Among these, scrap offers significant advantages under Scope 3 of the GHG Protocol.

In this study, experiments and EDEM simulations were conducted to enable the effective use of scrap in blast furnaces. Softening Under Load (SUL) tester experiments were performed to simulate the cohesive zone of the blast furnace under varying scrap mixing ratios, from which the optimal usage ratio was determined. EDEM simulations, based on full-scale models of the blast furnace and ore bins, were used to reproduce charging layer formation under different ore–scrap mixing conditions.

The combined results identified the optimal charging layer configuration and operating method for scrap utilization, leading to the establishment of practical blast furnace operation technology. Theoretical analysis indicates that incorporating 5% scrap into the blast furnace can reduce the coal ratio by 22.759 kg/t-p and lower total CO_2 emissions by approximately 4%.

Speaker Country

Korea South

Speaker Company/University

POSCO

Primary author: KIM, Juhun (POSCO)

Presenter: KIM, Juhun (POSCO)

Session Classification: Recent progress and new developments in CCS/CCU

Track Classification: EMECR: EMECR 2. Major improvements in Blast Furnace ironmaking