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Smelter for Green Iron Production and Consequences for the BOF

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Hydrogen-based direct reduction combined with a two-step process employing a Smelter and a BOF is the most promising green steel production route using low-grade iron ores. As the BOF is still operated in this new route, todays and future crude steel quality requirements can be fully met. The hot metal from the Smelter is similar to the blast furnace one, with slightly lower carbon and silicon levels, reducing the available chemical energy in the BOF for scrap melting. Several tools and practices have been developed to compensate for this and push for higher scrap rates.
In the paper, the BOF operations using melts from BF or Smelter are compared with a focus on C, Si, N, and S. In addition, options to increase the scrap rate are presented such as post-combustion and scrap preheating lances. Furthermore, a roadmap for first realization, validation and upscaling of this new process is shown.

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