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## The potential of selective adjustments to the suction gas in iron ore sintering to reduce greenhouse gas emissions

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European steel companies are endeavoring to switch to direct reduction plants and will do so in the coming years, although primary steel production in Europe is currently still conducted exclusively in integrated steelworks. The ferrous feed material is mainly produced in sinter plants for the blast furnace, with waste gas recirculation representing the current state of the art. For infrastructural reasons, the transition from the blast furnace route to direct reduction plants can only take place gradually, so that these two production routes will coexist and potential synergies can be exploited. For example, an increased use of oxygen as a by-product of electrolysis is possible. In addition, new types of metallurgical waste gases, exemplified by those derived from direct reduction plants, can be used. For these reasons, the sinter process is facing a transformation to meet future challenges and therefore a more profound understanding of the potential influence of the individual constituents, in particular O<sub>2</sub>, CO, and H<sub>2</sub>O, in the suction gas is essential. Within this paper miniaturized lab scale sinter experiments are presented using an industry like raw mixture to study the effects of individual O<sub>2</sub>, CO and H<sub>2</sub>O variation on the sinter process and sinter quality. As the O<sub>2</sub> content (up to 30 vol.%) in the suction gas increases, both the sintering yield and the strength increase resulting in lower return rates, with more or less constant amounts of CO in the off gas. Productivity and sintering strength increase with increasing CO concentration, while NO concentrations in the exhaust gas tend to be lower. With increasing moisture, productivity and sintering strength increase with significantly lower CO concentrations in the off gas, due to the water-gas shift reaction taking place in the flame front. The results show potential for adjusting the recipe of the raw mixture by selectively adjusting the suction gas, in particular towards a lower coke breeze content, which would enable a reduction in the specific emissions of CO and CO<sub>2</sub> per ton of product sinter.

### Speaker Country

Austria

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No

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