Climate-neutral steelmaking

Aerosol method of producing green steel

Invention

Currently, green steel is manufactured by means of direct iron ore reduction with green hydrogen. Making steel from the pig iron requires a certain proportion of carbon in the iron, which is generally achieved by adding a gas, such as methane or ethane, that contains carbon. The new method uses a carbon-containing aerosol instead of a gas. It supplies the liquid and solid elements of the aerosol by means of renewable energy. The Fischer–Tropsch process is used to synthesize a carbonic liquid from the freed CO2. The liquid can contain large quantities of the necessary hydrogen. The solid used could be biochar.

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Commercial Opportunities

In steel and iron production, green hydrogen and electrified processes could eliminate classic coal furnaces, allowing climate-neutral steel production. The essential advantages of the new method:

- Green steel can be completely green without relying on fossil fuels.
- The system can be run in a closed cycle in which the exhaust CO2 can be directly reused as raw material.
- Green steel can be completely green without fossil fuels.

Current Status

The invention is based on an idea whose fundamental technical feasibility has not yet been confirmed. A patent application has been submitted to the German Patent and Trade Mark Office. Within the priority year, applications can be submitted abroad. We are offering interested companies the opportunity to license and refine the technology in collaboration with the inventors and the Hamm-Lippstadt University of Applied Sciences.

An invention of Hamm-Lippstadt University of Applied Sciences.

Competitive Advantages

- Direct reduction
- Green steel
- Circular economy
- Climate-neutral

Technology Readiness Level

1 2 3 4 5 6 7 8 9

Basic principles observed

Industries

- Steelmakers
- Metal industry
- Hydrogen economy

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