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Development of a Smelting Reduction Process for Recycling Steelmaking Dust

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Synopsis :
Kawasaki Steel has developed, in Chiba Works, a new smelting reduction process for the recycling of the steelmaking dust containing valuable metals. This process is characterized by a coke packed-bed shaft furnace with two-stage tuyeres (STAR process) which enables direct use of dust without agglomeration. Bench-scale and pilot-plant tests were carried out to confirm the principles and effectiveness of the process. A commercial plant with the metal production of 140 t/d started its operation in May, 1994 and has been operating successfully. Development of the STAR process has enabled to improve the retrieving ratio of metallic sources (Fe, Cr, Ni) contained in steelmaking dust.

The body can be viewed from the next page.

for Recycling Steelmaking Dust*

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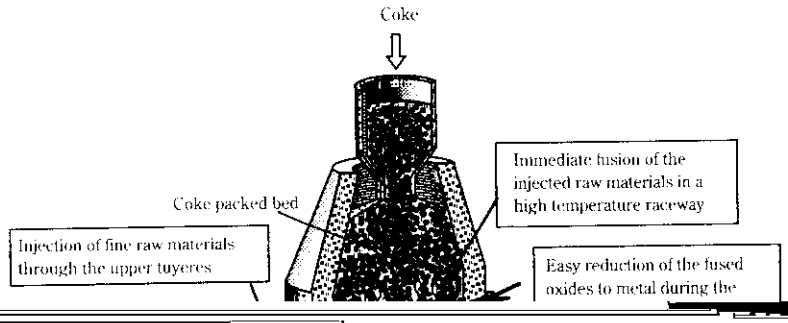
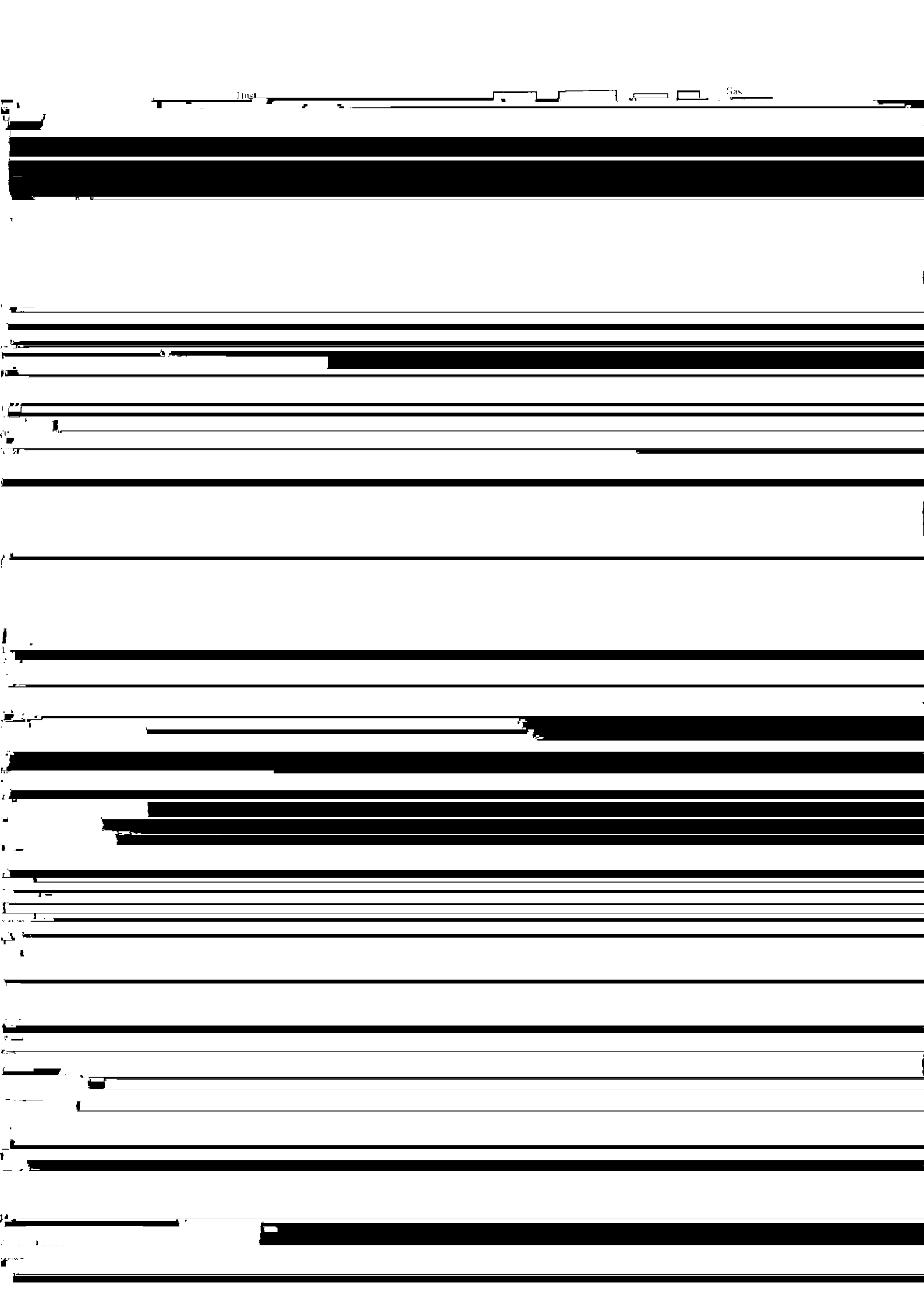
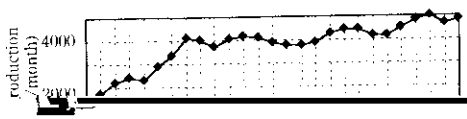
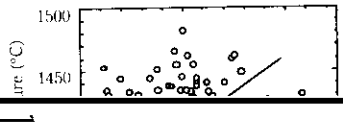

Coke
Immediate fusion of the injected raw materials in a high temperature raceway
Coke packed bed
Injection of fine raw materials through the upper tuyeres
Easy reduction of the fused oxides to metal during the


ection rate of
aw material
(kg/h)
1500
1000
500
Bench-scale FeCr
Pilot-plant 30% Cr
Pilot-plant FeCr
Steelmaking dust


Dust
Gas


roduction
(month)
4000


1500
1450

blast volume and enriched oxygen after calculating the necessary heat for reduction from the composition and

and MnO concentrations of slag.

On the basis of the above test results, the pilot plant was

6 Conclusions

Kawasaki Steel developed a new process for the smelting reduction of steelmaking dust and recovery of valuable metal components at high yields using a coke packed-bed shaft furnace with two-stage tuyeres (the STAR process).

After the start-up period of about 6 months, the designed production capacity of 140 t/d was achieved and the commercial plant has since been operating smoothly.

References

1) T. Hamada, S. Takeuchi, K. Igawa, H. Katayama, H. Itaya, and