

INFLUENCE OF CARBURIZATION BY USING CHARCOAL FOR CAST IRON AS RECARBURIZER

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Introduction

The utilization of Biomass resources has actively been studied as for gasification, power generation, and so on. In this research a new utilization of charcoal is studied. The value added to charcoal is named as biocarbon. This value added to charcoal is used as a recarburizer for casting. Charcoal is added into the melted iron in the furnace. The carbon is an important element for casting iron. Coke from coal is usually used as a recarburizer. Charcoal can take the place of coke. The current study is on carburization to cast iron for using charcoal as a recarburizer.

Experimental Methods

<Sample>

The samples are used as follows (Table1.).

Table 1. Character of Samples

Sample	Density (g/cm ³)	Specific surface area (m ² /g)	Ash (%)	Surfur (%)
Actual-ly used coke	1.65	3.62	18.80	0.12
Charcoal	0.45	16.21	1.11	0.03
High-density Charcoal	1.13	12.86	0.80	0.04

The charcoal is widely used. The high density charcoal is made from saw powder in our laboratory.

<Experiment in a Small Furnace>

A small high-frequency induction furnace is used(Fig.1.). These recarburizers such as charcoal, coke and high-density charcoal are put on the bottom of the furnace and 10kg of iron scrap is put on. The furnace is heated up to about 1600C. Then deoxidizers such as aluminum and lime are turned on (Fig.2.). Iron samples are taken out by a ladle. The carbon content in the iron is analyzed by a quantmeter.



Fig.1. High-frequency furnace

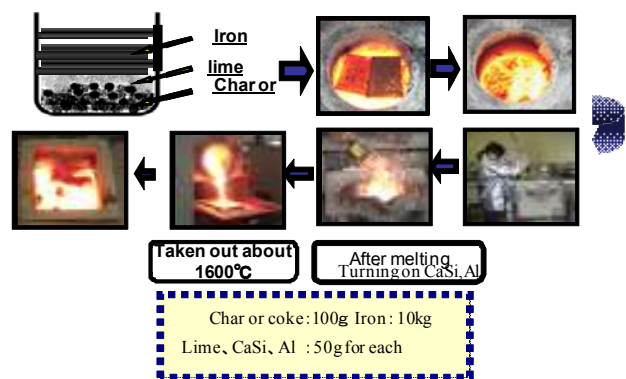


Fig. 2. Effect of charcoal for recarburizer is examined in the small furnace

Results and Discussion

The result is shown in Table 2.

Table 2. Elements in molten iron

	Elements(%)					
	C	Si	Mn	P	S	Al
Iron scrap	0.14	0.23	1.08	0.016	0.004	0.01
Actually used coke	0.53	0.30	0.59	0.018	0.006	0.39
Charcoal	0.65	0.26	0.67	0.015	0.004	0.20
High-density Charcoal	0.67	0.27	0.64	0.016	0.004	0.27

The content of carbon in the molten iron is not so different, and especially the content of carbon in the molten iron by using actually used coke is lower than that by using charcoal and high density charcoal.

Fig.3. showed the appearance of carburizing in short time when recarburizer was added to the molten iron. As a result, the carburizing to the molten iron has shown that charcoal is faster than coke. This reason is considered to be some difference of the crystallographic structure of coke and charcoal. Moreover, the difference of the surface area of coke and charcoal may be a cause.

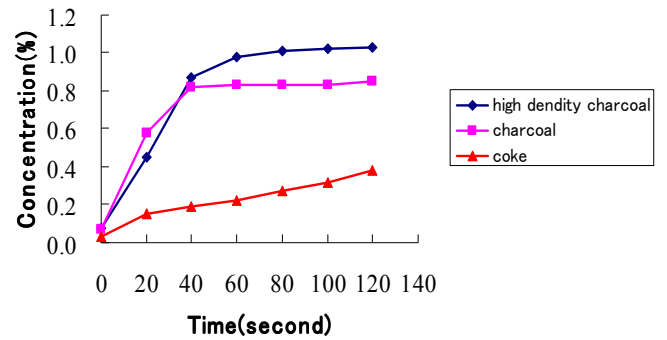


Fig. 3. Carburizing in short time to molten iron.

Conclusions

Coke from coal is usually used as recarburizer. Charcoal can take the place of coke. Moreover, The charcoal of the carburizing to the molten iron is earlier than that of coke.