The Effect of Minor Oxide Components on Reduction of El-Baharia Iron Ore Agglomerates via Hydrogen or Coke

Thesis Submitted

For

Ph.D. Degree in Chemistry

By

Inass Ashraf Khalil Sayed Nafeaa

M.Sc. in Chemistry (2013)

To

Chemistry Department, Faculty of Science,

Ain Shams University

(2016)

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Abstract

⇒ These investigations studied the effect of dolomite or lime addition to the Egyptian iron ore raw material on the physicochemical properties of its pellets in green and indurate form. The effect of these additions on the degree of reduction was also studied. The results indicated that the addition of (2%-8%) dolomite or lime decreases the mechanical properties of both green and indurate pellets. The reduction of these produced pellets via hydrogen was also studied and the model of reduction is shown in this work.

⇒ In these investigations the effect of dolomite addition to iron oxide raw material on the physicochemical properties of its briquettes in a green form and indurate form was also studied. And the effect of this addition on the degree of reduction also was investigated. The results indicated that the addition of (2%-8%) dolomite improves the mechanical strength of the green briquettes while the mechanical strength of indurate form decreases. The reduction of these briquettes via hydrogen was studied and the model of reduction was illustrated in this investigation.

⇒ This investigation studied the effect of lime addition to iron ore raw material on the physicochemical properties of its green briquette forms and indurate forms. The effect of this addition on the degree of reduction was also studied. The results indicated that the addition of (2%-8%) lime improves the mechanical properties of the briquettes in both green and indurate forms. Also the reduction of these briquettes via hydrogen was studied and the model of reduction was given in this work.

Abbreviations

°C	Celsius degree
°K	Kelvin degree
cm	centimeter
g	gram
h	hour
j	joule
k	kilo
l	liter
min	minutes
mm	millimeter
s	second
nm	nanometer
ml	mille
mg	mille gram
MPa	Mega Pascal
μm	micrometer

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