

SIMULATION OF COAL GASIFICATION AND INVESTIGATION OF IRON COMPOUNDS

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ABSTRACT

IGCC gasifier simulation using chemcad chemstation 7 was carried out. This study has been completed using Chemcad Chemstation Version 7 with a temperature range from 0 °C to 1500 °C and the iron component formed during the gasification process takes place. are FeS, Fe, FeSO₄, FeCl₃, FeS₂, but the iron components that make up the slag are FeS, Fe, FeCl₃.

Keyword : Chemcad Chemstation Version 7 ,Coal Ash Slag, IGCC, Iron Compound

INTRODUCTION

Gasification process is a complex ensemble of chemical and physical phenomena. Iron is by far the most abundant heterovalent component in coal ash, and slag which shows significant variations under oxidation and reduction conditions. The prediction of ash and slag under high temperature gasification conditions has been studied from chemical balance points (Sukgyu Lim et al, 2007).

RESEARCH METHODOLOGY

The main equipment used in this study is Chemstations Chemcad Version 7. Steps to start the simulation are calculation of kinetic parameter, making a new component, making the flow process, setting the operating condition on each device, sensitive study to determine the operating temperature at each device, sensitive study for investigation iron compound during gasification process.

RESULTS AND DISCUSSION

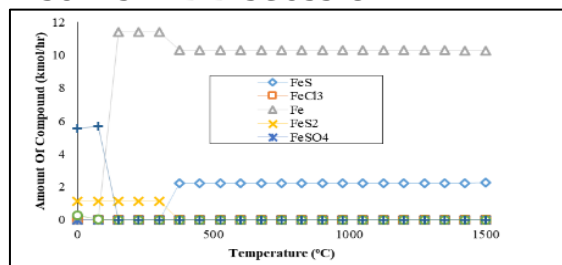


Figure 1. Investigation Iron Compound During Gasification Process

The iron compound formed in the coal gasification process is Fe, Fe₃O₄ (Magnetite), KFe³⁺₃(OH)₆(SO₄)₂ (Jarosite), FeS₂(Pyrite). The iron compound formed during gasification process depend on the chemical and mineral composition contained in the coal and also gasification operating temperature.

CONCLUSION

The iron compound formed at temperatures from 0°C to 1500°C is FeS, Fe, FeSO₄, FeCl₃, FeS₂, and the iron compound formed as part of the constituent slag is FeS with concentration 25,681%, Fe with concentration 74,316%, and FeCl₃ with concentration 0,003 %.

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