



## CHAPTER V CONCLUSIONS

The product of the reduction can be classified into three types of phase separation: (1) Complete separation; the iron oxide was reduced completely, the metal and the slag separated perfectly; (2) Partial separation, the metal and the slag separated partially; and (3) Direct reduction, the iron reduction was not yet complete, the metal and slag did not separate.

The laboratory experiments show the suitable conditions for making Iron nugget (over 94 % Fe and % yield more than 94 %) from the low grade iron ore (55.99 % iron content) and a low grade coal (40% fixed carbon) as the raw materials. The suitable conditions for making the Iron nugget, from a pellet which has a diameter of 2.5 cm and 4 cm high, are by using the mol ratios of the mixture as  $C/Fe = 1.53$ ,  $Limestone/Al_2O_3+SiO_2 = 0.75$ , and  $Bentonite/Fe = 0.02/1$  with the reduction temperature of  $1425^\circ C$  and at the reduction time of 20 min.