

## Studi Transformasi Fasa Sistem Besi Karbon dengan Pengamatan Thermal Diferensial

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### Abstrak

Phase transformation studies have been carried out for pure iron and iron-carbon compounds of composition 0.1wt%C (low carbon), 0.4wt%C (hypo-eutectoid), and 0.8wt%C (nominal eutectoid) respectively. The samples were produced by powder metallurgy method. In this case Fe-C alloys were prepared by mixing both Fe and C powder prior to loading into a cylinder die and subsequently pressed using uniaxial force of 5 tons. The pressed samples (grain compact) were inserted into the quartz tube and air was evacuated by vacuum to the level of  $1.5 \times 10^{-2}$  mbar and then heated to 1100°C for 6 hours toward fully dense samples. Sintered samples were cooled in the furnace to room temperature. Results of OTA experiment indicated that ferromagnetic transition of pure iron taking place at temperature of 774°C and phase transformation of ferrite-austenite at temperature of 929°C. For 0.1wt%C alloy was occurred pearlite-austenite transition at temperature of -723°C with enthalpy of formation of 17.14J/g, and pro-eutectoid ferrite-austenite transition at temperature of 930°C. For 0.4wt%C alloy was occurred enthalpy of formation increasing of pearlite-austenite to 41.1 SJ/g. For nominal composition of 0.8wt%C was occurred enthalpy of formation increasing of pearlite-austenite to 72.0SJ/g at temperature of -723°C. From this study, it is found that the microstructure of pearlite consisted of ferrite and cementite in the lamellar structure. The volume fraction of pearlite consistently increased to 100% as the carbon content increased to the eutectoid composition.