

## 고 Si 구상흑연 주철 용접 열영향부에서의 액화 거동

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### Liquation behavior in the weld HAZ of high silicon nodular cast iron

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#### Abstract

In the present study, liquation behavior in the weld heat affected zone (HAZ) of nodular cast iron with 4% Si was investigated. Thermal cycle of weld HAZ was simulated by Gleeble simulator with various peak temperatures and fast heating rate of 1000°C/sec was selected to observe the constitutional liquation phenomena.

During continuous heating, liquation of  $\gamma + \text{Laves (Fe}_2\text{(Mo, Si))}$  and  $\gamma + \text{Fe}_3\text{C}$  eutectic constituent was found above 1130°C and it has been proved by differential thermal analysis (DTA). The result of DTA has shown that eutectic constituent of  $\gamma + \text{Laves}$  and  $\gamma + \text{Fe}_3\text{C}$  begin to melt at 1110°C and 1140°C, respectively. Meanwhile, constitutional liquation by  $\gamma + \text{graphite}$  occurred above 1140°C which is due to carbon enrichment around graphite nodules. In the as-welded specimen, traces of liquid films along grain boundaries and lots of pores were observed and these indicates that liquation behavior of nodular cast iron accounts for hot cracking in the weld HAZ.

**Key Words** : Nodular cast iron, HAZ, Constitutional liquation, Hot cracking