

Effect of chromium on bainite transformation and microstructural evolution in austempered unconventional steels 42SiCr and 42SiMn

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Abstract:

Enrichment of austenite with carbon in the course of austempering is a fundamental mechanism which leads to incomplete bainite transformation. Higher carbon content in untransformed austenite, together with the presence of silicon, is understood to lead to stabilization of austenite. As a result, austenite does not decompose and carbide precipitates do not form which are otherwise present in conventional bainitic microstructures. Although evidence of the beneficial effects of silicon and carbon on austenite stabilization in unconventional CFB steels is irrefutable, the present experiments showed that an addition of chromium plays a very important role in achieving incomplete bainite transformation. This paper deals with the effect of the chromium level on bainite transformation and microstructural evolution in unconventional steels 42SiCr and 42SiMn during austempering.

Key words:

Austempering, silicon, chromium, stability of untransformed austenite