Microstructure and Mechanical Properties of 0.63-12.7Cr Martensitic Stainless Steel During Various Tempering Treatments

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Abstract

In this study, the microstructure and mechanical properties of 0.63C-12.7Cr martensitic
stainless steel during various tempering treatments were investigated. Experimental results
demonstrate that finely distributed primary carbides can be observed in 0.63C-12.7Cr martensitic
stainless steel. It was also found that the measured hardness of 0.63C-12.7Cr martensitic stainless
steel after 300°C tempered treatment for 60 minutes can still reach to 677Hv. The variation of
measured hardness was found not significant during tempering treatments (200°C-500°C).
Moreover, owing to lower concentration of C and Cr, the matensitic transformation temperature Ms
can be increased to 96.4°C comparing to -127°C of SUS440C materials.

Keyword：Martensitic stainless steel、Carbide、Tempering treatment、Hardness