Martensite morphology and strain aging behaviours in intercritically treated low carbon steel

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Abstract:

The strain aging behaviour of intercritically annealed low carbon steel with different martensite morphologies has been investigated. Aging experiments after 4% prestrain were carried out at 180°C for different times ranging from 10 to 160 min. It was found that the variation in bake hardening response $\Delta Y$, lower yield stress and ultimate tensile stress with aging time describes a similar trend for all three microstructural variants, but the absolute values of bake hardening response, lower yield stress and ultimate tensile stress are higher for the microstructure containing fibrous, more uniformly distributed martensite. The aging response of fibrous martensite was also found to be slower, and the fibrous martensite morphology provided the best combination of strength and ductility as desired for dual phase steels.

Keywords: Microstructure; Mechanical properties; Martensitic transformation; Dual phase steel

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