EFFECT OF VANADIUM ON ULTRA-HIGH STRENGTH BOLT WITH ENHANCED HYDROGEN DELAYED FRACTURES

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Abstract

Ultra high strength bolt for automobile were manufactured with adding small amount of vanadium. Recently, the lighten component parts in automobile are of special interest due to fuel economy and environmental measure. However, the enhancement of strength for automobile steels has become to be needed for increasing of bolt strength that it had more sensitive to delayed fracture with increased their strength. Therefore, there have been lots of reports to prevent or restrain the hydrogen induced delayed fracture (HDF) in high strength bolt. However, the hydrogen induced delayed fracture is not solved satisfactorily in theroetical and experimental aspect. The delayed fracture phenomena of high strength bolt are related to hydrogen behavior in the materials. So, to develop of high strength bolt steels, the resistance of hydrogen induced delayed facture must be improved. There are three specific mechanism of hydrogen delayed fracture is practicable; induced hydride formation and cleavage; hydrogen-enhanced localized plasticity; hydrogen-induced decohesion. However, exact mechanism and/or inhibition of HDF have not done yet. In the present study, ultra high strength bolt with adding vanadium was introduced as hydrogen trapping site and the effect of carbon-nitride on hydrogen delayed fracture resistance of bolt steels was investigated.

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