The Effect of Phase Transformation on the Tensile Fracture of Austenitic Stainless Steel

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Austenitic stainless may undergo phase transformation during plastic straining. In the present work, the effect of martensitic transformation was investigated in a stable AISI 310 and metastable AISI 302 stainless steel subjected to tensile tests at temperatures in the range of -196 to 15°C. Fractographic analysis by scanning electron microscopy revealed considerable differences between the fracture modes of both steels. The stable AISI 310 displayed a typical ductile rupture at the whole temperature range investigated. On the other hand, the metastable AISI 3012 showed evidence of brittle fracture from -196 to 0°C due to martensite transformation.