

Microstructure and Hot Deformation Behavior of Fe-20Cr-5Al Alloy

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Abstract : Abstract—High temperature deformation behavior of cast Fe-20Cr-5Al alloy has been investigated in this study by performing tensile and compression tests at temperatures from 1100 to 1200oC. Rectangular ingots of which the dimensions were 300×300×100 in millimeter were cast using vacuum induction melting. Phase equilibrium was calculated using the FactSage®, thermodynamic software and database. Tensile strength of cast Fe-20Cr-5Al alloy was 4 MPa at 1200oC. With temperature decreased, tensile strength increased rapidly and reached up to 13 MPa at 1100oC. Elongation also increased from 18 to 80% with temperature decreased from 1200oC to 1100oC. Microstructure observation revealed that M₂₃C₆ carbide was precipitated along the grain boundary and within the matrix.

Keywords : 20 Cr-5Al ferritic stainless, high temperature deformation, aging treatment, microstructure, mechanical properties

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