URN etd-0407109-183702-71
Author Sheng Li Co
Author's Email Address No Public.
Statistics This thesis had been viewed 42 times. Download 304 times.
Department
Year 2005
Semester 2
Degree Master
Type of Document Master's Thesis
Language zh-TW.Big5 Chinese
Title The Ordering Phase Transformation Study of Fe-28Mn-8Al-10Co-0.5C alloys
Date of Defense 0000-00-00
Page Count 87
Keyword
Fe-Mn-Al-Co-C alloy
transmission electron microscopy
B2 and DO3 ordered phases
phase transformation
(Fe,Mn)3AlCX carbides

Abstract
The purpose of the present study is an attempt to examine the effects of aging treatments on the microstructural changes and ordering phase transformations of an Fe-28Mn-8Al-10Co-0.5C alloy by means of optical microscopy (OM), transmission electron microscopy (TEM) and energy-dispersive X-ray spectrometry (EDS). The effects of carbon and cobalt additions on the microstructural changes of the Fe-Mn-Al-Co-C alloys are also investigated.
Based on TEM examinations, it was concluded as bellows: (1) In the as-quenched condition, the microstructure of the Fe-28Mn-8Al-10Co-0.5C alloy was the mixture of (ferrite + austenite) phases. TEM examinations revealed that no carbides precipitated within the austenite matrix, however, (B2+DO3) phases could be found within the ferrite region. (2) When the alloy was aged at temperatures ranging from 450℃ to750℃, the ordering transformation sequence of (+B2+DO3) → +B2+DO3+（Fe,Mn）3AlCX→(B2+γ) occurred within the ferrite region. (3) When the Fe-28Mn-8Al-10Co-0.5C alloy was aged at 550℃,（B2＋DO3）ordered phases grew preferentially along <100> directions significantly. The co-existence of（B2＋DO3）ordered phases within the ferrite region has never reported in the Fe-Mn-Al-C alloy before. (4) The effects of Co additions inhibited the formation of (Fe,Mn)3AlCX and -Mn precipitates in the Fe-Mn-Al-C alloys. At the same time, we concluded that the higher Co additions obviously enhanced the formation and phase field of B2 ordered phase. With increasing the aging temperature, B2 ordered phase and austenite precipitates were more stable than DO3 ordered phase and (Fe,Mn)3AlCX carbides. (5) The experimental results indicated that the lower carbon contents in the Fe-Mn-Al-Co-C alloy inhibited the precipitation of (Fe,Mn)3AlCX carbides within the austenite matrix and also enhanced the formation of B2 ordered phases within the ferrite region. Besides, the lower carbon addition also resulted in the larger stable temperature range of austenite particles precipitated within the ferrite region. This result has also never been found by other researchers before.
Advisory Committee - advisor

Files etd-0407109-183702-71-002.pdf
etd-0407109-183702-71-001.pdf
etd-0407109-183702-71-004.pdf

etd-0407109-183702-71-003.pdf
etd-0407109-183702-71-005.pdf
etd-0407109-183702-71-006.pdf
etd-0407109-183702-71-007.pdf

indicate access worldwide
Date of Submission 2006-07-25