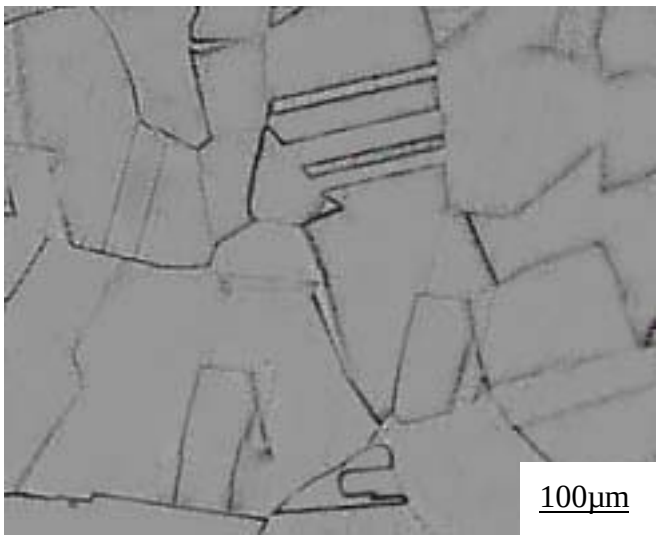

Figure 1(a)

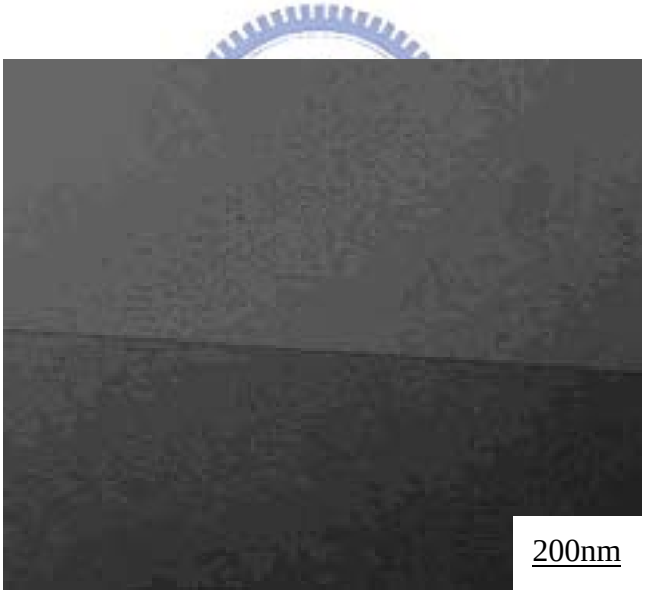

Figure 1(b)

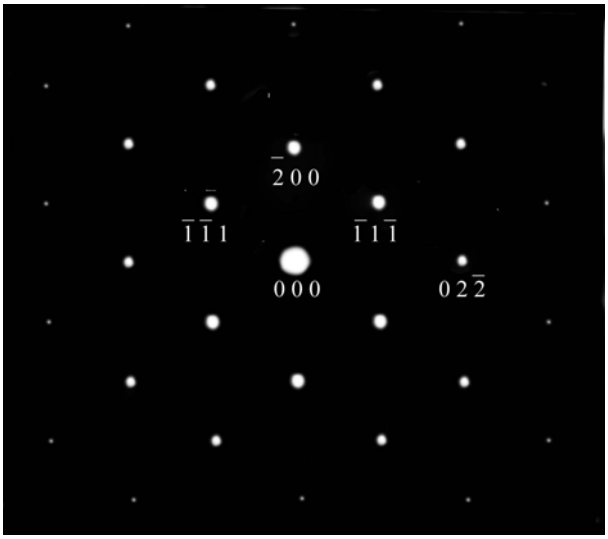

Figure 1(c)

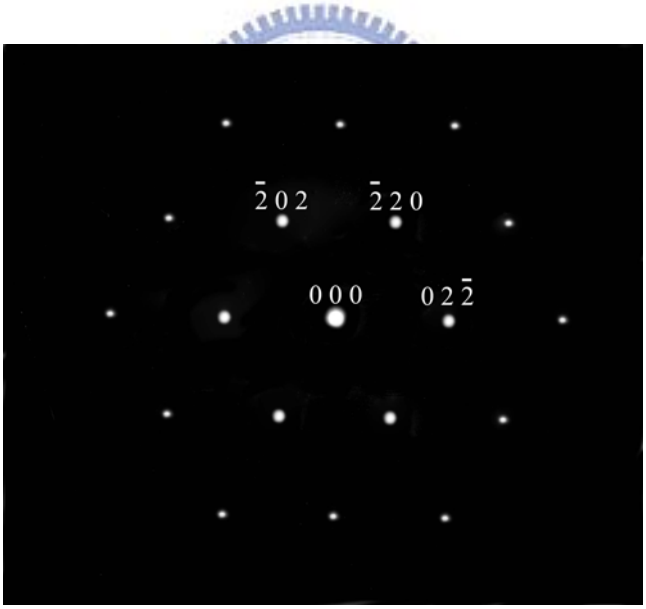

Figure 1(d)

Figure 1. (a) an optical micrograph of the as-quenched alloy. Electron micrographs of the as-quenched alloy, (b) BF, (c) and (d) two SADPs taken from the austenite matrix. The foil normals are [011] and [111], respectively.

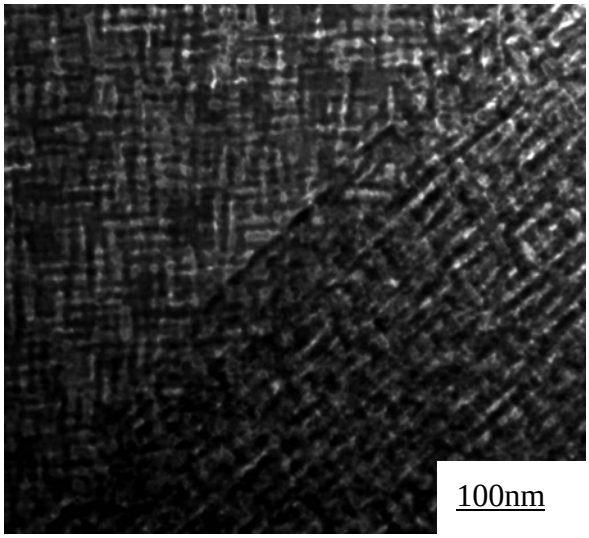

Figure 2(a)

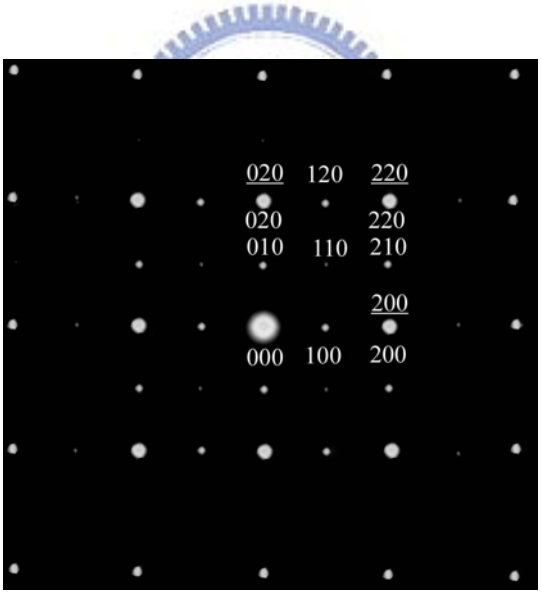

Figure 2(b)

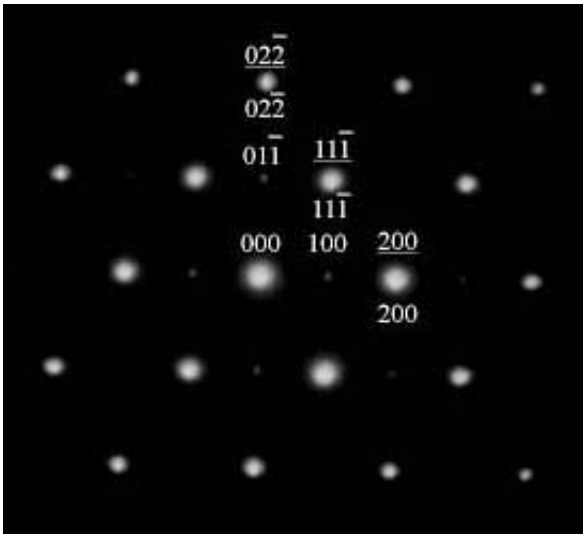

Figure 2(c)

Figure 2. Electron micropgraphs of the alloy aged at 550℃ for 6 hours, (a) BF, (b) and (c) two SADPs taken from a mixed region covering the fine κ'-carbides and the austenite matrix. The zone axes are [001] and [011], respectively. (<u>hkl</u> =austenite matrix; hkl = κ'-carbide)

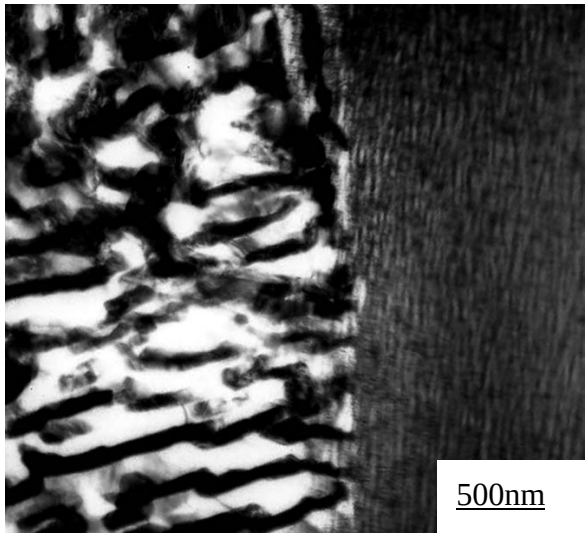

Figure 3(a)

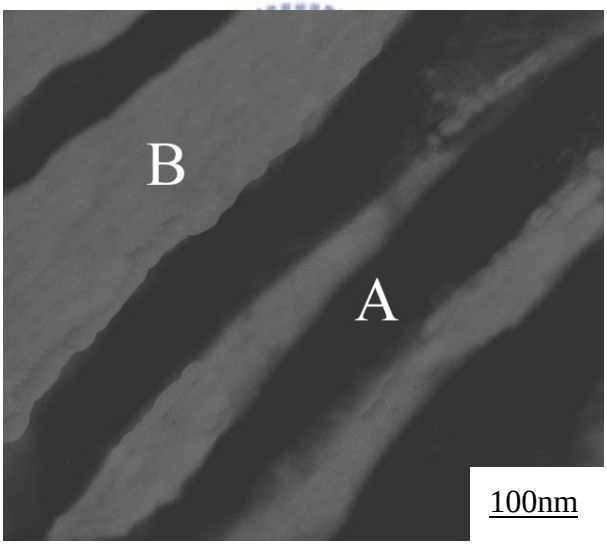

Figure 3(b)

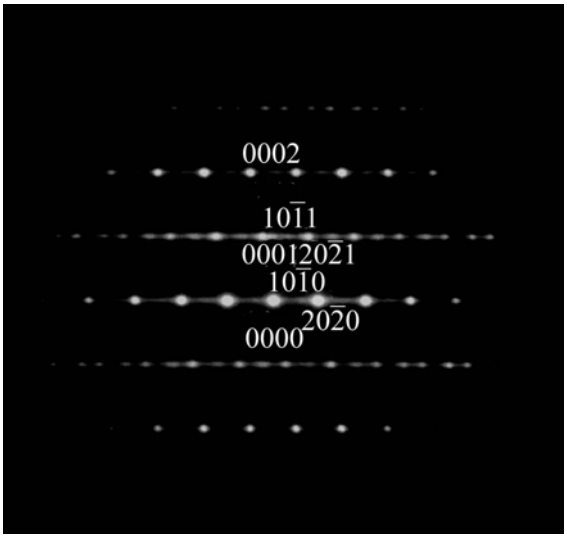

Figure 3(c)

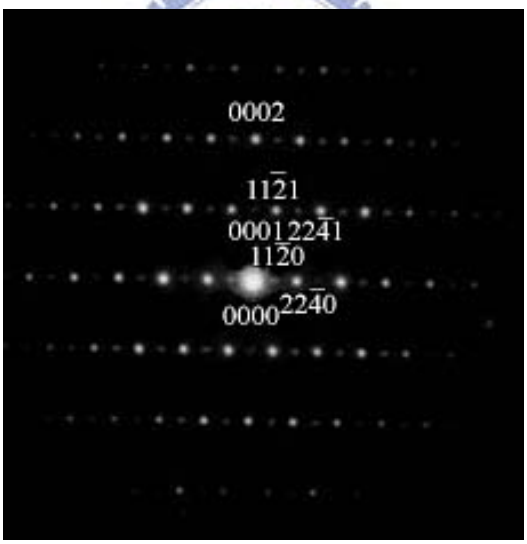

Figure 3(d)

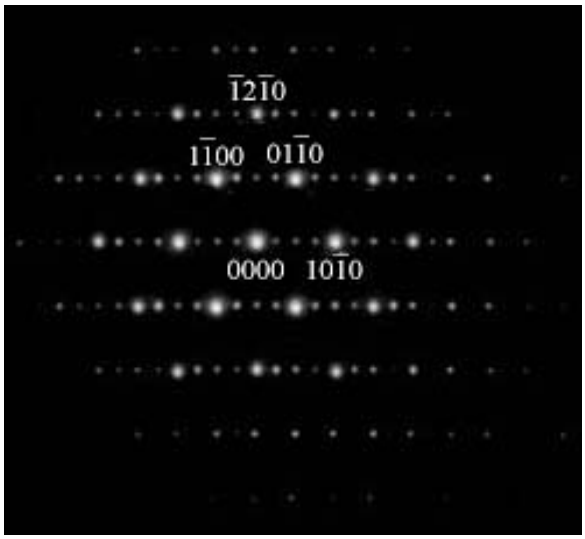

Figure 3(e)

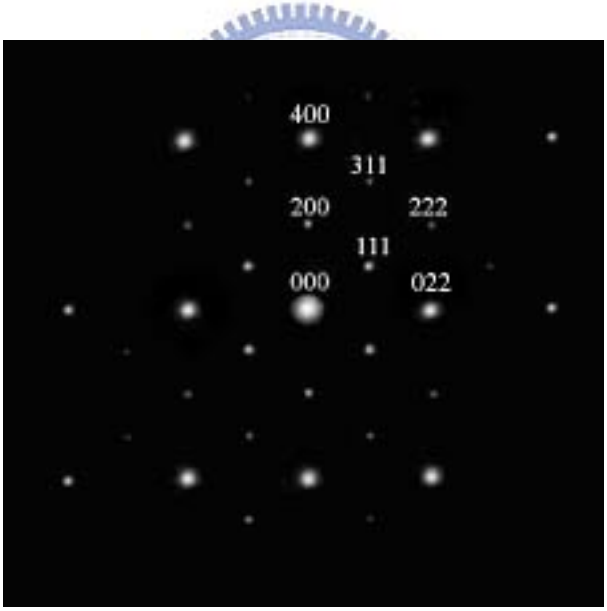

Figure 3(f)

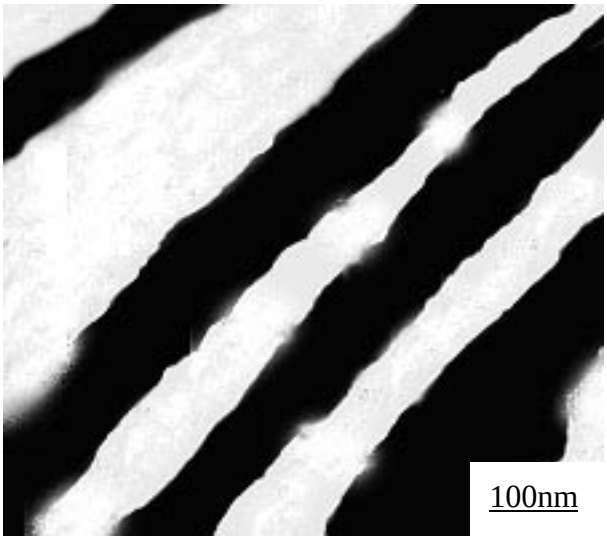

Figure 3 (g)

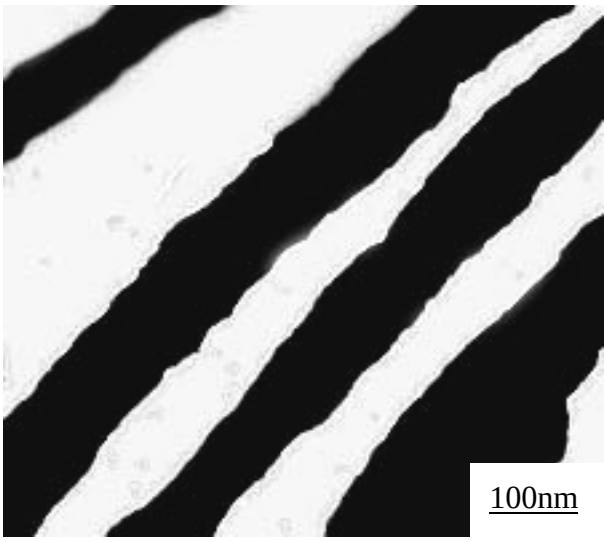

Figure 3(h)

Figure 3. Electron micrographs of the alloy aged at 550℃ for 72 hours, (a) and (b) BF, (c) through (e) are three SADPs taken from the precipitate marked as A in (b). The foil normals are [1210], [1100] and [0001], respectively. (f) an SADP taken from the area marked as B in (b). The zone axe is [011]. (hkl = $D0_3$) (g) and (h) are (111) and (200) $D0_3$ DF, respectively.

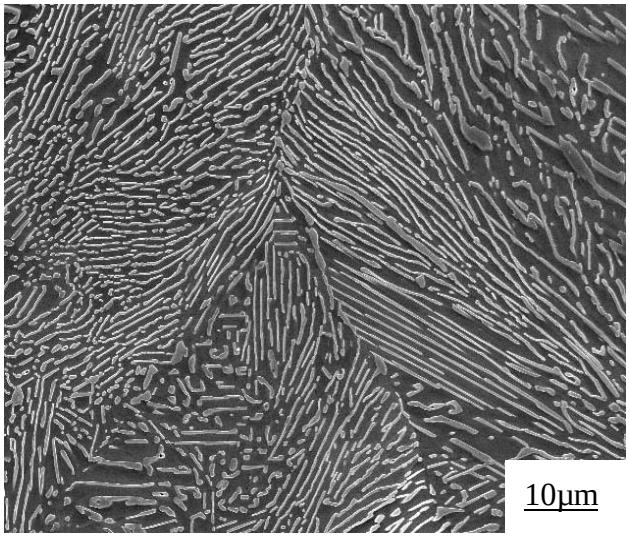

Figure 4

Figure 4. An SEM electron micrograph of the alloy aged at 550℃ for 240 hours

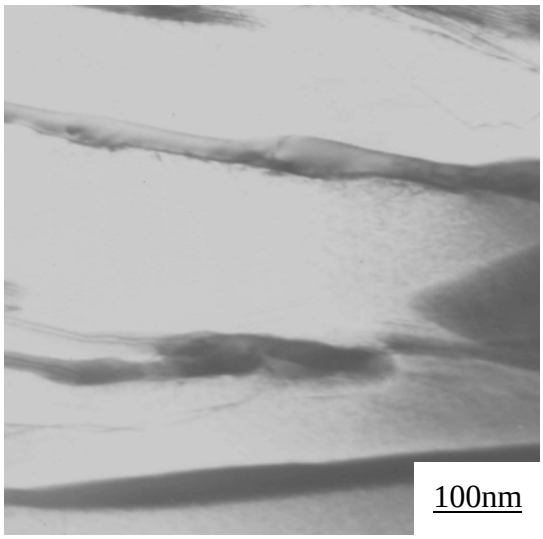

Figure 5(a)

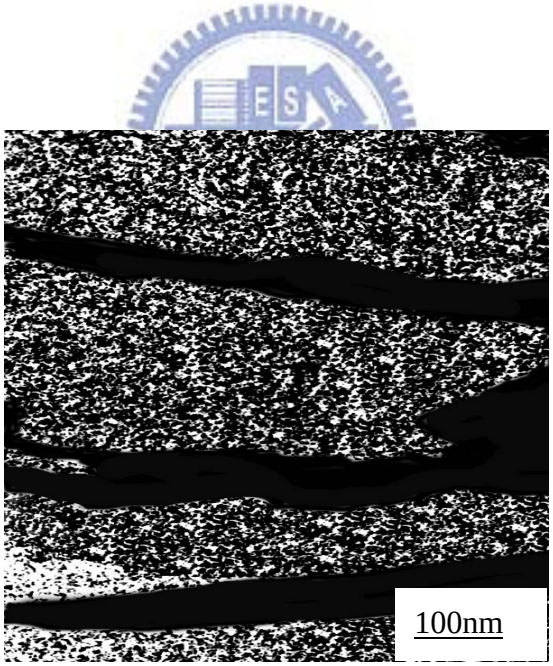

Figure 5(b)

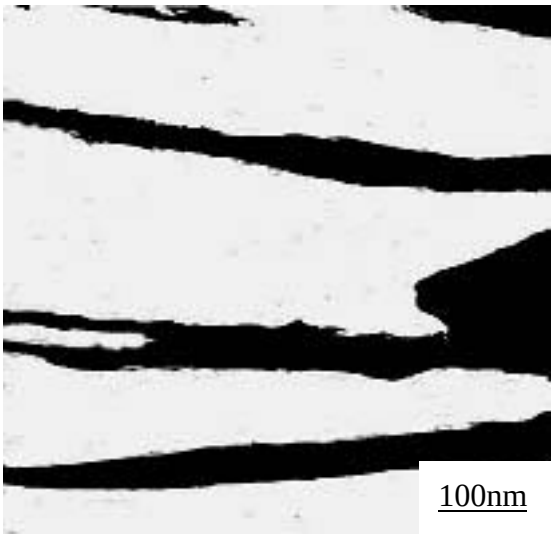

Figure 5(c)

Figure 5. Electron micrographs of the alloy aged at 650℃ for 72 hours, (a) BF. (b) and (c) are (111) and (200) $D0_3$ DF, respectively.

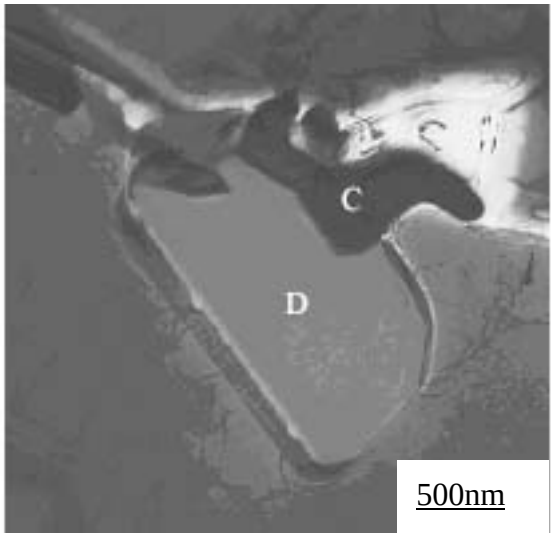

Figure 6(a)

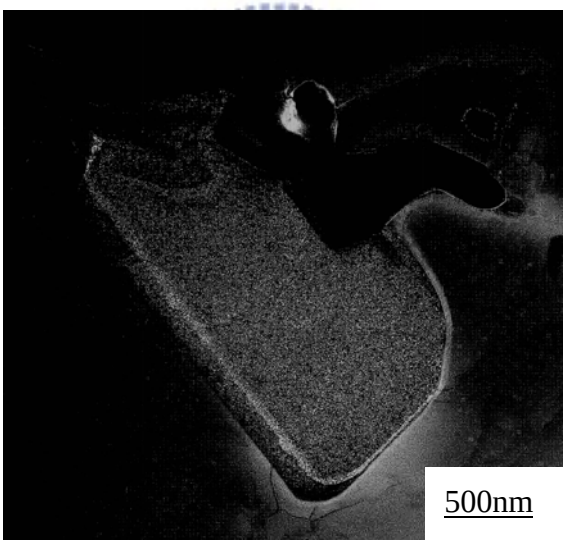

Figure 6(b)

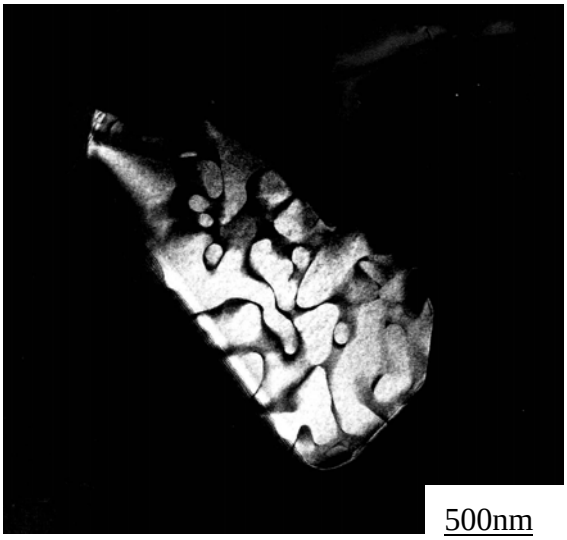

Figure 6(c)

Figure 6. Electron micrographs of the alloy aged at 750℃ for 24 hours, (a) BF. (b) and (c) are (111) and (200) $D0_3$ DF, respectively.

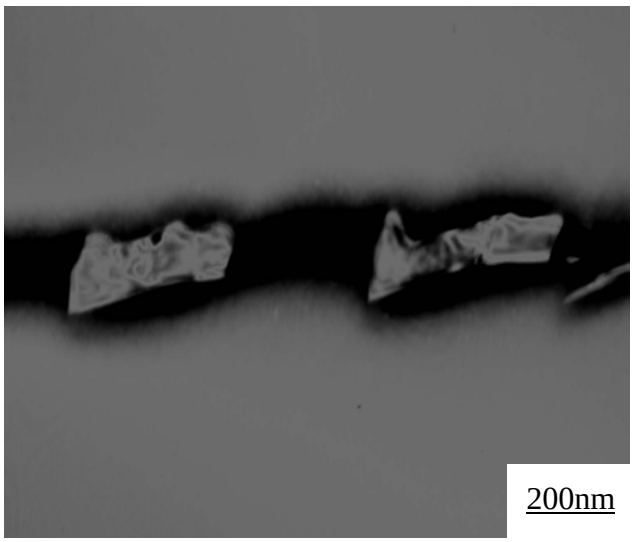

Figure 7(a)

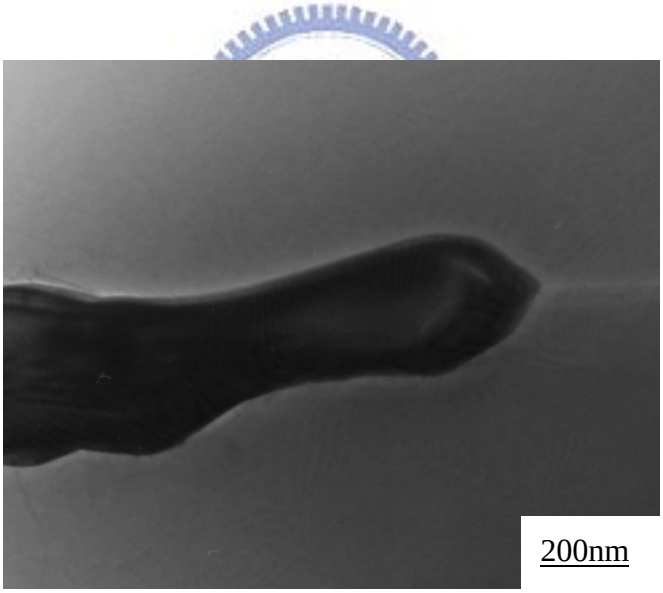

Figure 7(b)

Figure 7. (a) BF electron micrograph of the alloy aged at 850℃ for 2 hours and (b) BF electron micrograph of the alloy aged at 850 ℃ for 6 hours.

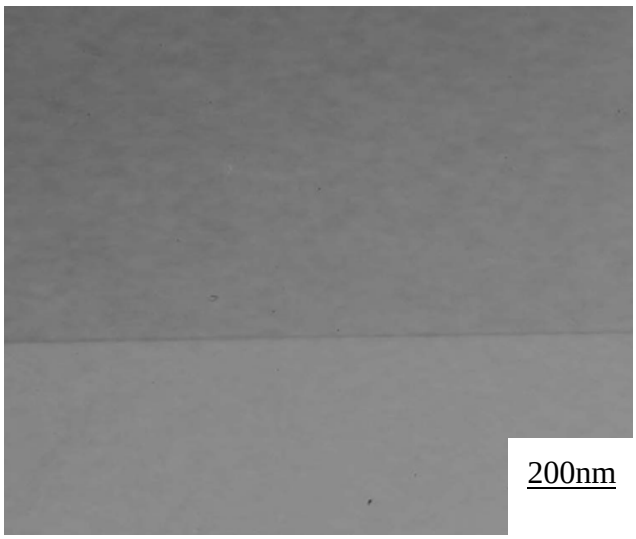

Figure 8

Figure 8. BF electron micrograph of the alloy aged at 1000℃ for 2 hours.

Table I. Chemical Compositions of the Phases Revealed By an Energy-Dispersive Spectrometer (EDS)

Chemical Composition (wt%)

Heat Treatment	Phase	Fe	Al	Mn	Cr	Si
As-Quenched	γ phase	Bal.	8.75	30.02	5.86	1.01
550℃ Aging	$D0_3$ phase	Bal.	12.29	17.21	1.24	1.70
	$(Fe,Cr,Mn)_7C_3$ carbide	Bal.	2.10	38.93	36.42	0.54
650℃ Aging	B2 phase	Bal.	11.58	22.95	2.53	1.62
	$(Fe,Cr,Mn)_7C_3$ carbide	Bal.	2.15	39.60	37.82	0.61
750℃ Aging	α phase	Bal.	11.05	25.44	2.98	1.22
	$(Fe,Cr,Mn)_7C_3$ carbide	Bal.	2.17	41.4	38.03	0.64
850℃ Aging	$(Fe,Cr,Mn)_7C_3$ carbide	Bal.	2.25	40.80	38.11	0.66