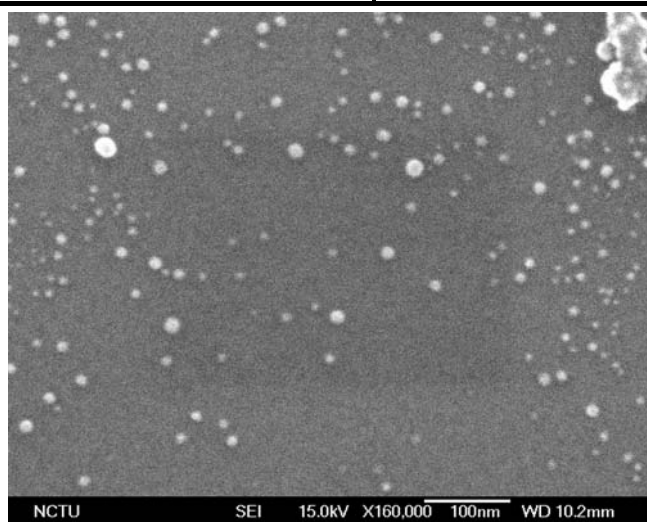
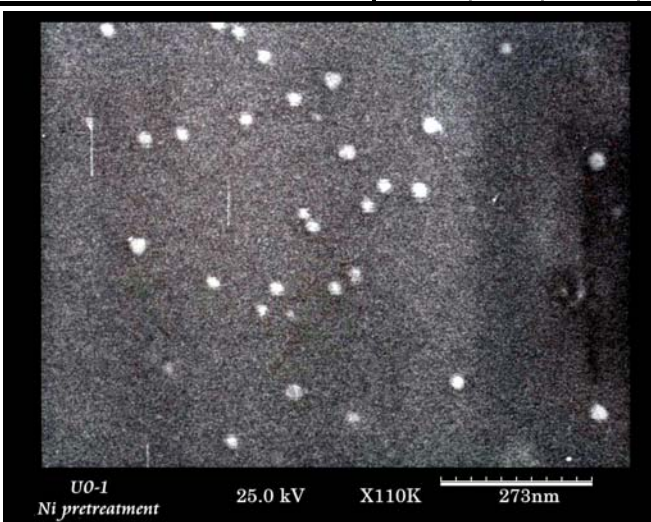


3. 編號 C 系列的鎳觸媒碳奈米管 SEM 影像圖

Specimen	C0	Step	Gas (sccm)			Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100		30 torr	400 W	10 min	400 °C
Substrate	Si	Step	Gas (sccm)			Pres	Power	Time	Temp
Diameter	Avg. 16.3	II							



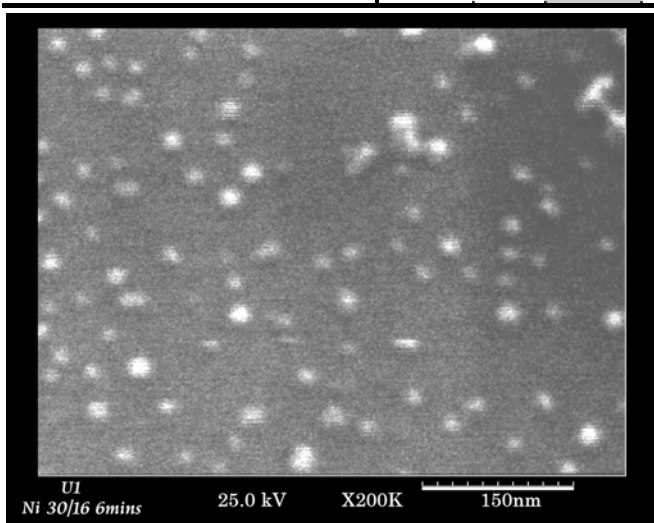
Specimen	C1	Step	Gas (sccm)			Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100		30 torr	400 W	10 min	360 °C
Substrate	SiO ₂	Step	Gas (sccm)			Pres	Power	Time	Temp
Diameter	Avg. 20.14	II							



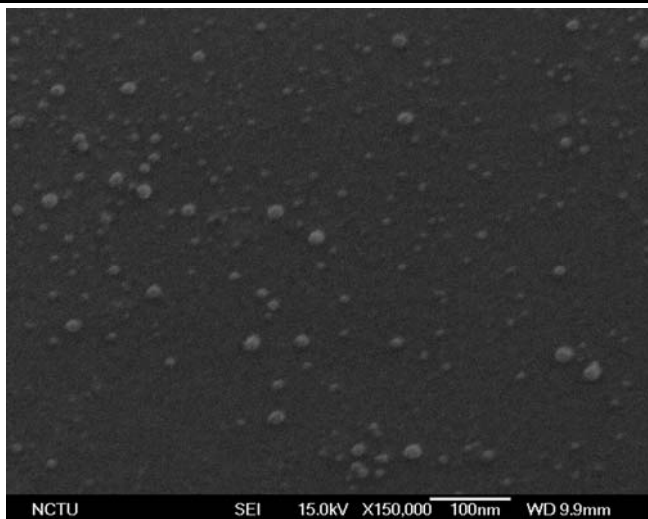
Specimen	C2	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	360 °C
Substrate	a:Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	Avg. 14.11	II								



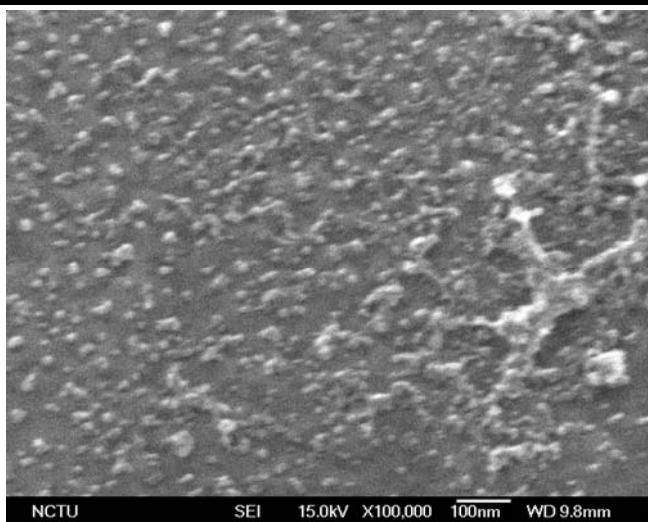
Specimen	C3	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	390°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	10~15	II	H ₂	50	CH ₄	5	16 torr	800W	6 min	583°C



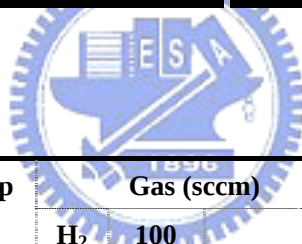
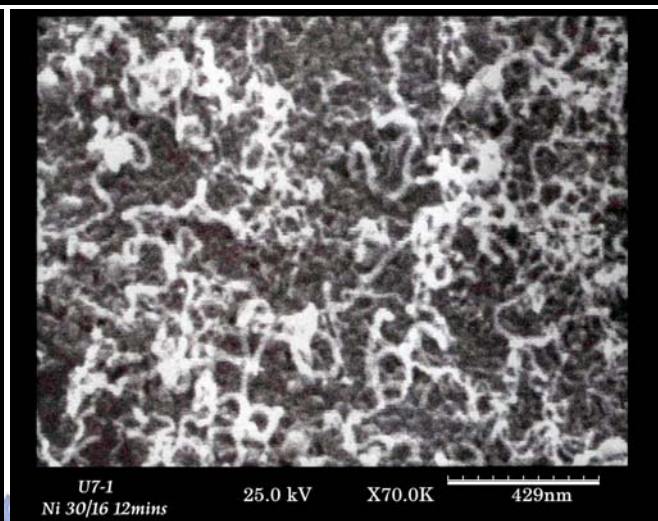
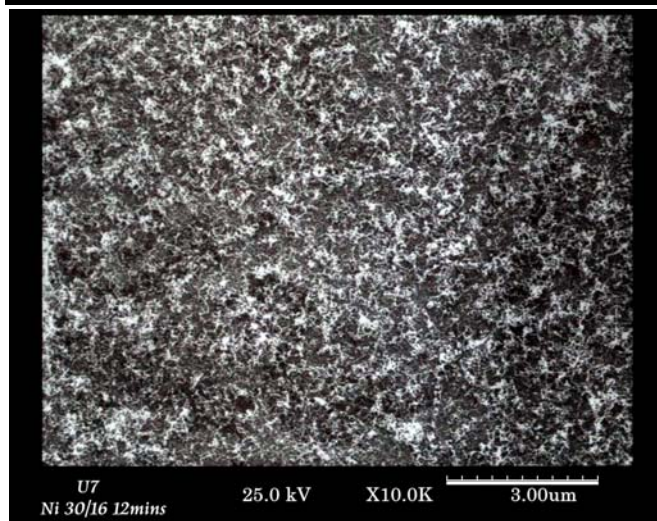
Specimen	C4	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	390°C
Substrate	SiO ₂	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	8~20	II	H ₂	50	CH ₄	5	16 torr	800W	6 min	583°C



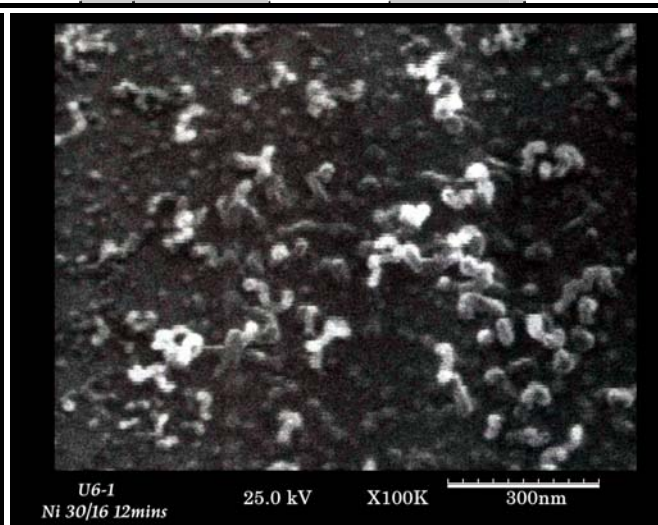
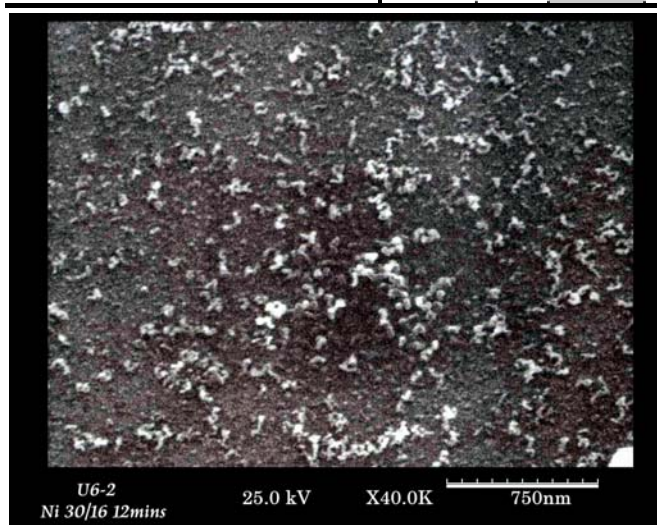
Specimen	C5	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	390°C
Substrate	a:Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	12~14	II	H ₂	50	CH ₄	5	16 torr	800W	6 min	583°C



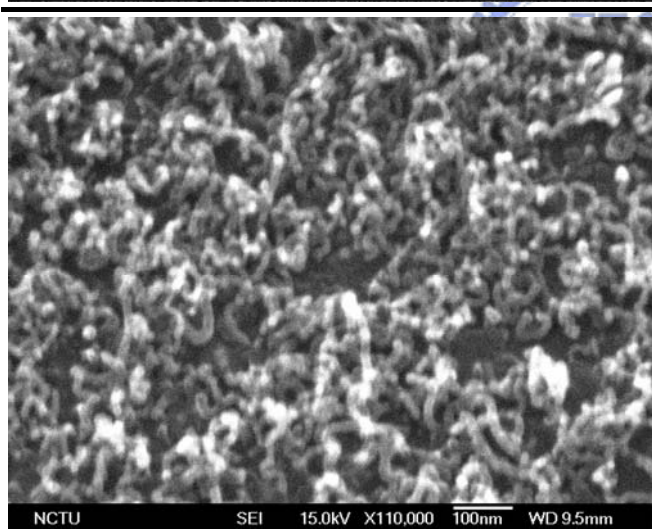
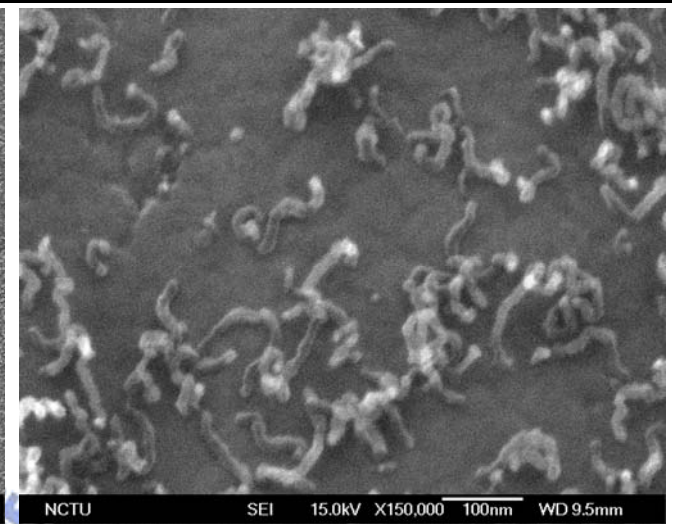
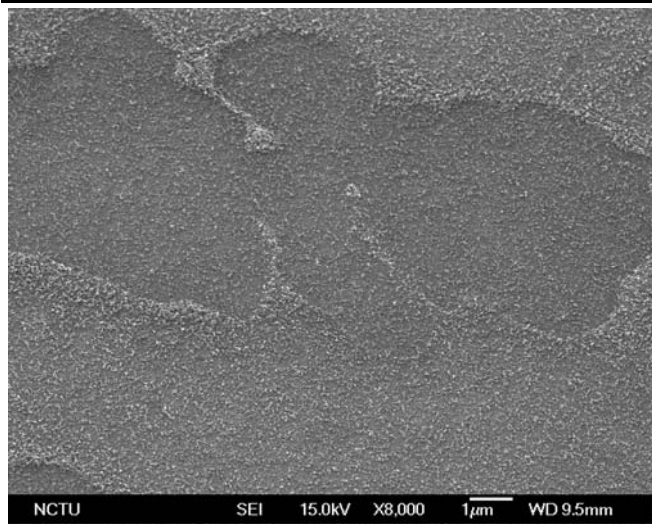
Specimen	C6	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	410°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	11~23	II	H ₂	50	CH ₄	5	16 torr	800W	12 min	610°C



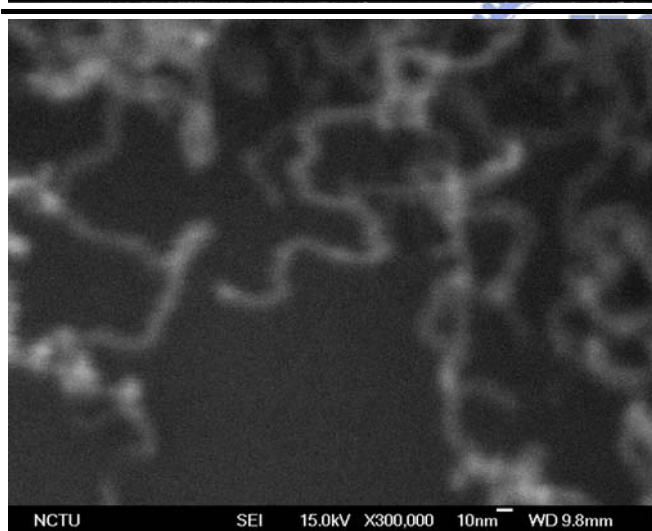
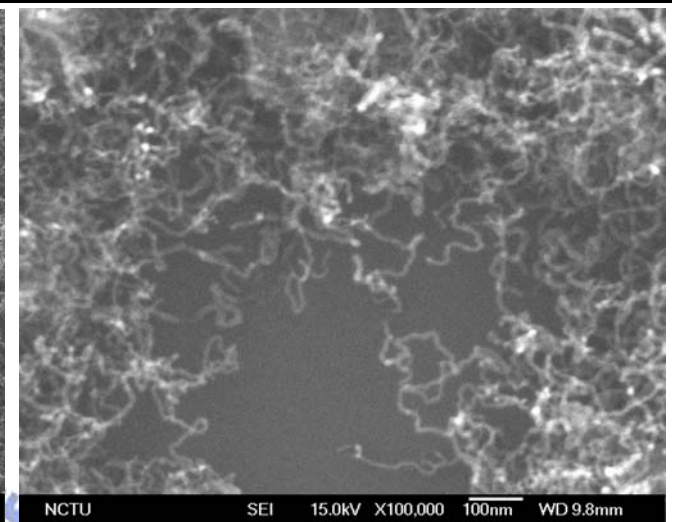
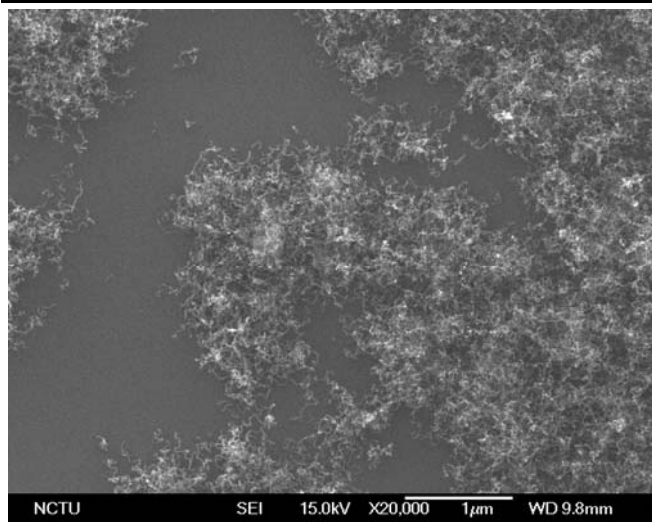
Specimen	C7	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	410°C
Substrate	SiO ₂	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	20~22	II	H ₂	50	CH ₄	5	16 torr	800W	12 min	610°C



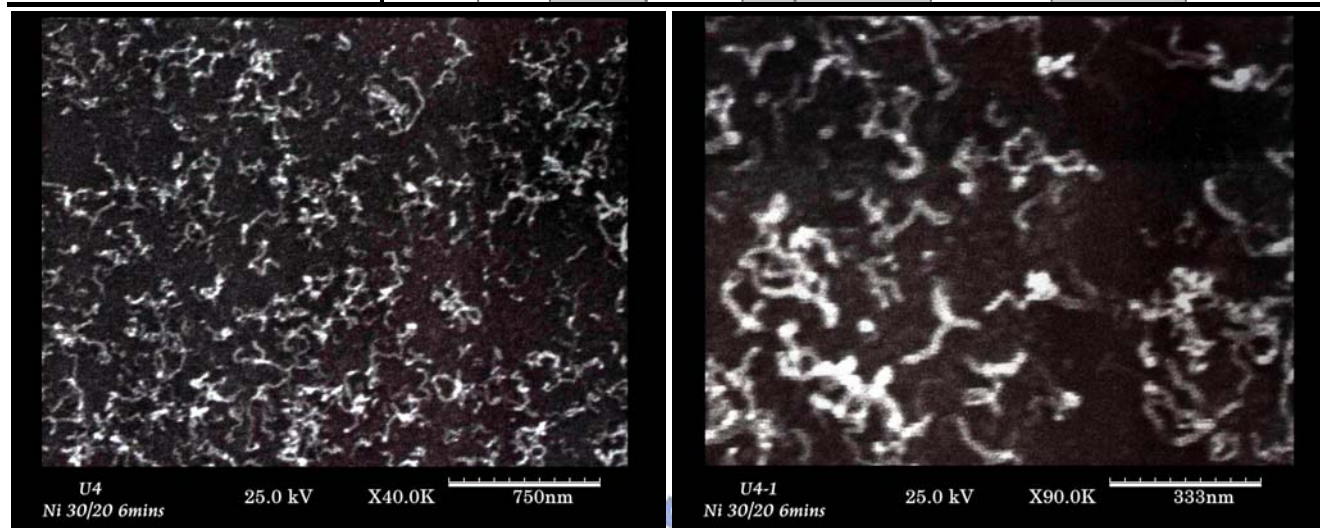
Specimen	C8	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	410°C
Substrate	a:Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	14~17	II	H ₂	50	CH ₄	5	16 torr	800W	12 min	610°C



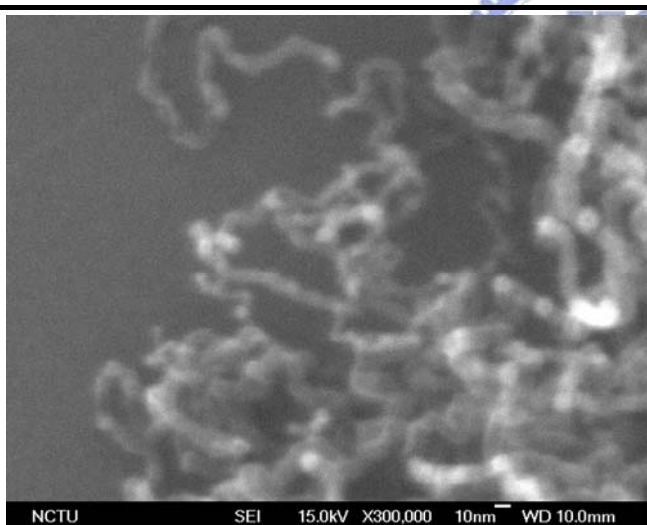
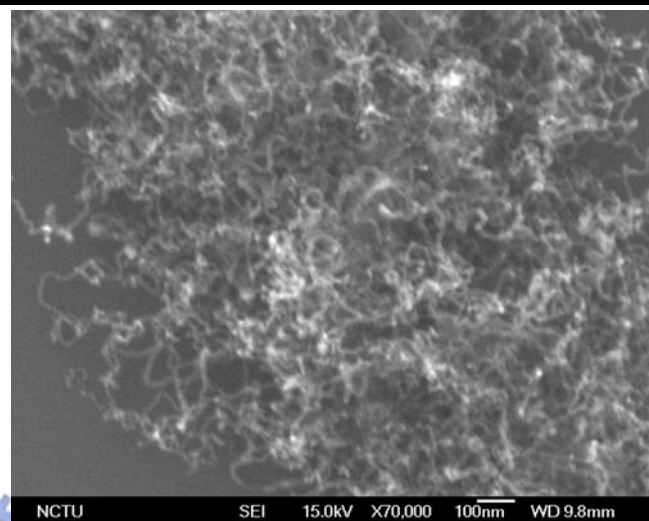
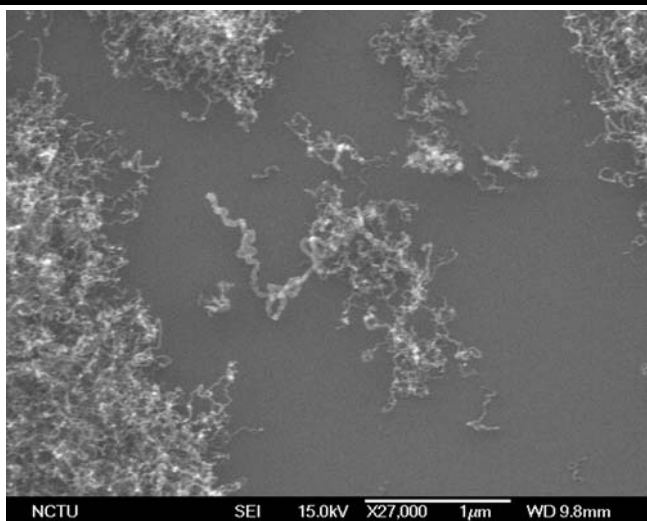
Specimen	C9	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	460°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	6.8~9.4	II	H ₂	75	CH ₄	5	16 torr	800W	6 min	580°C



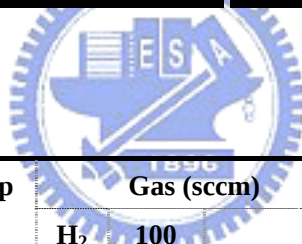
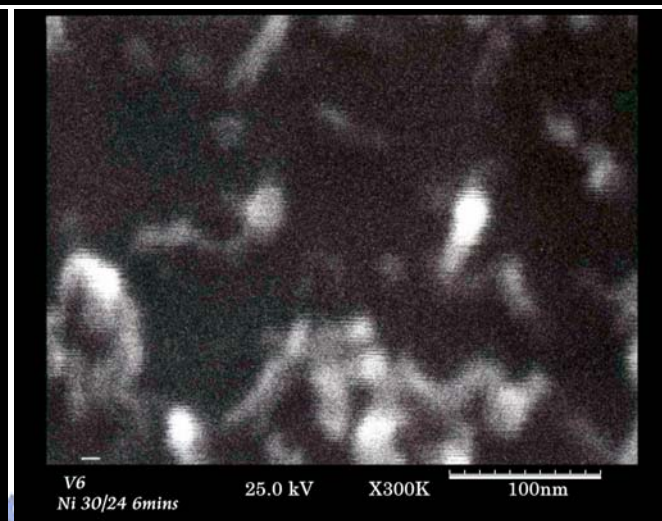
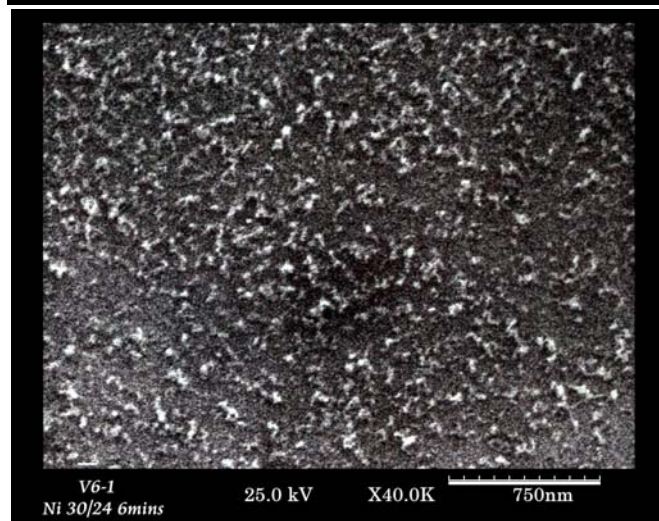
Specimen	C10	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	355°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	13~22	II	H ₂	50	CH ₄	5	20 torr	800W	6 min	564°C



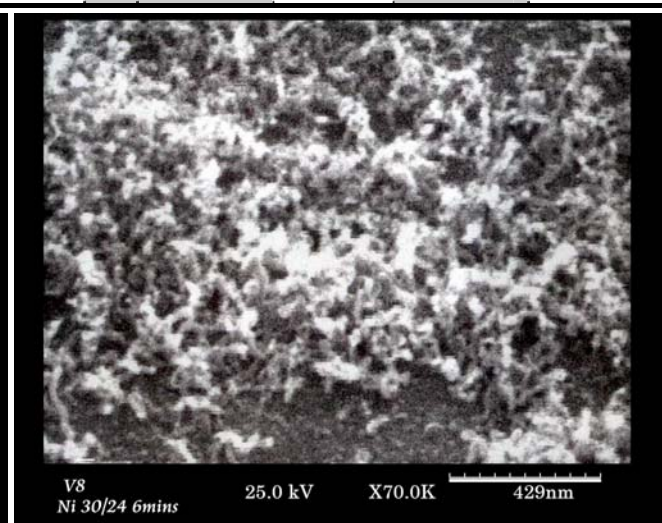
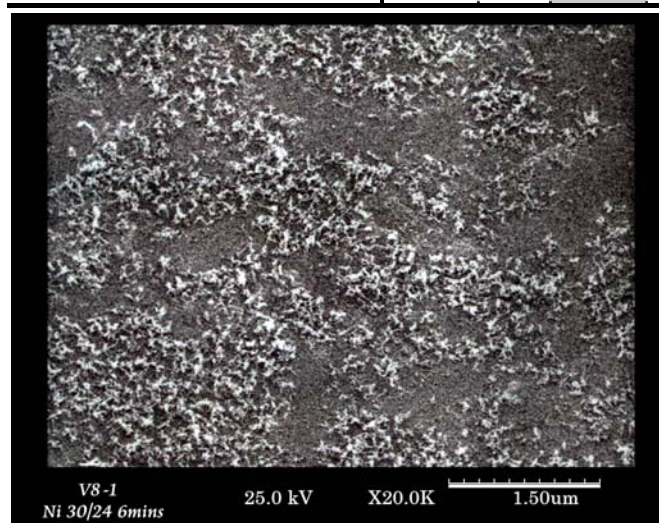
Specimen	C11	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	460°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	8~13	II	H ₂	50	CH ₄	5	24 torr	800W	6 min	600°C



Specimen	C12	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	320°C
Substrate	SiO ₂	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	18~19	II	H ₂	50	CH ₄	5	24 torr	800W	6 min	561°C

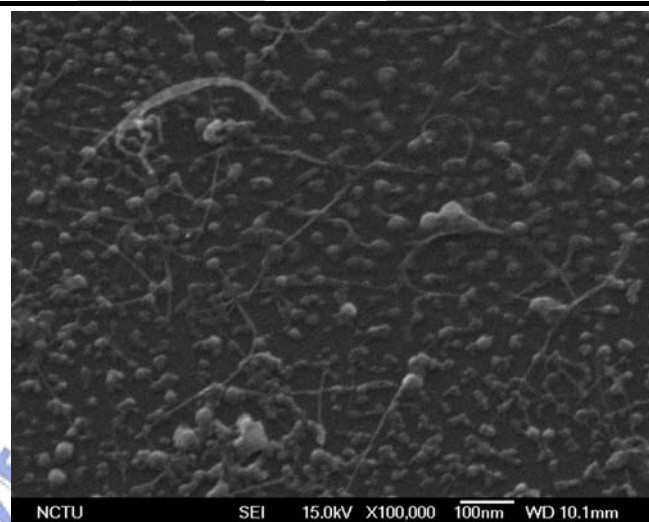
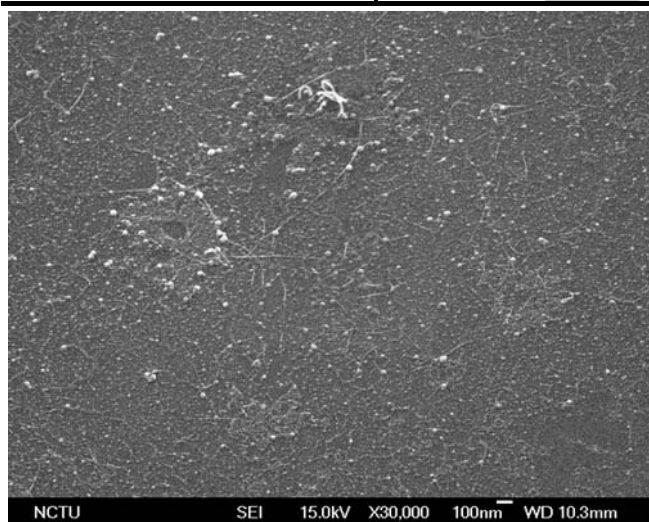


Specimen	C13	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Ni	I	H ₂	100			30 torr	400 W	10 min	320°C
Substrate	a:Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	18~20	II	H ₂	50	CH ₄	5	24 torr	800W	6 min	561°C

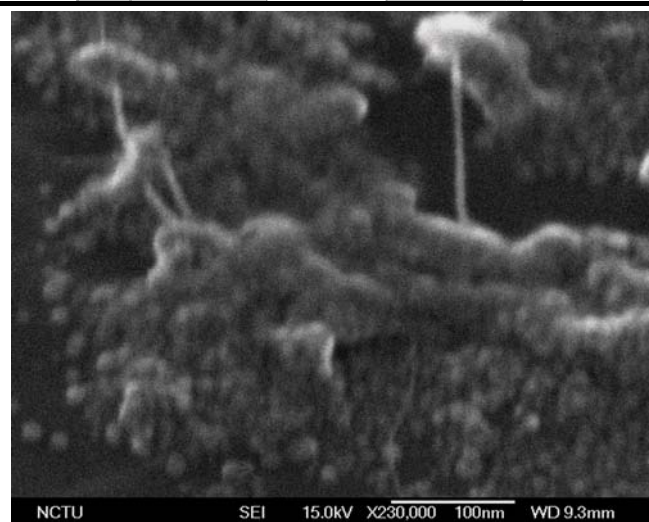
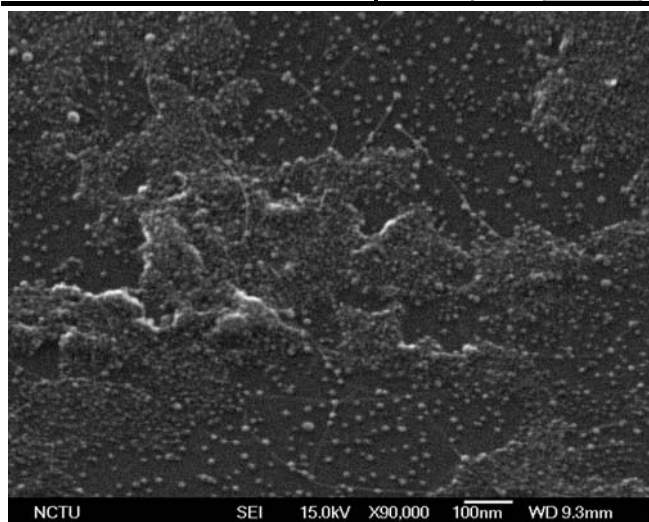


4. 編號 D、E、F 系列的碳奈米管 SEM 影像圖

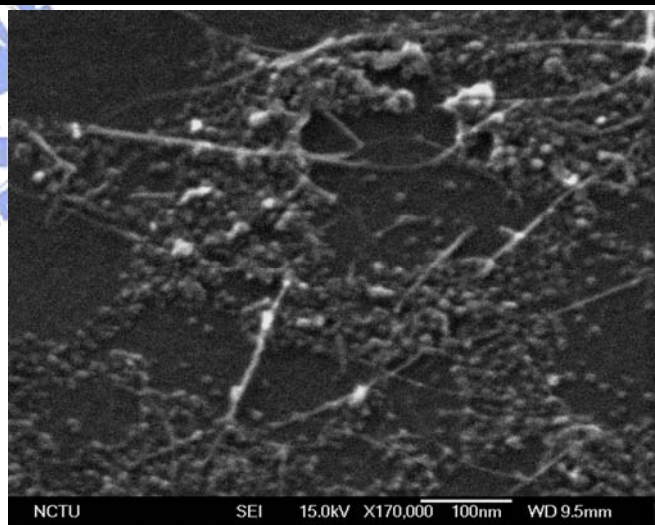
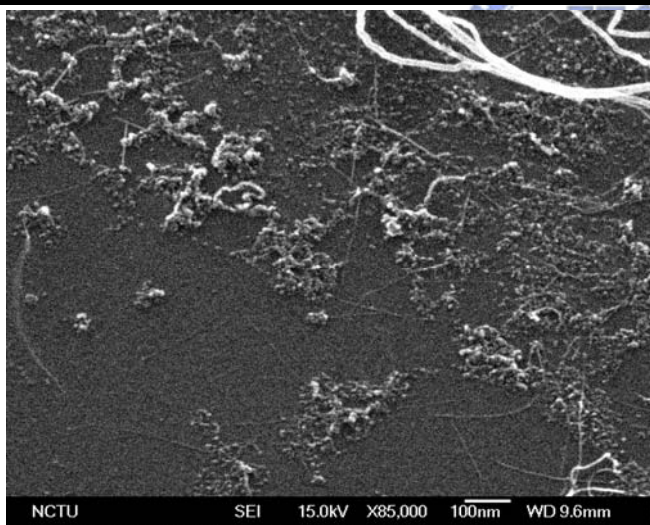
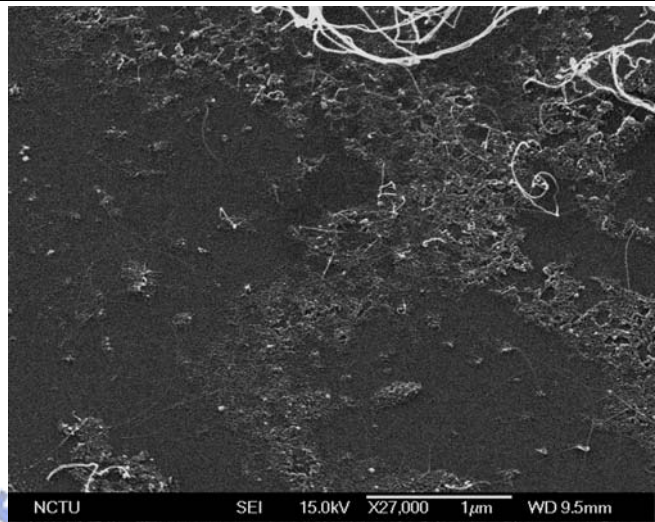
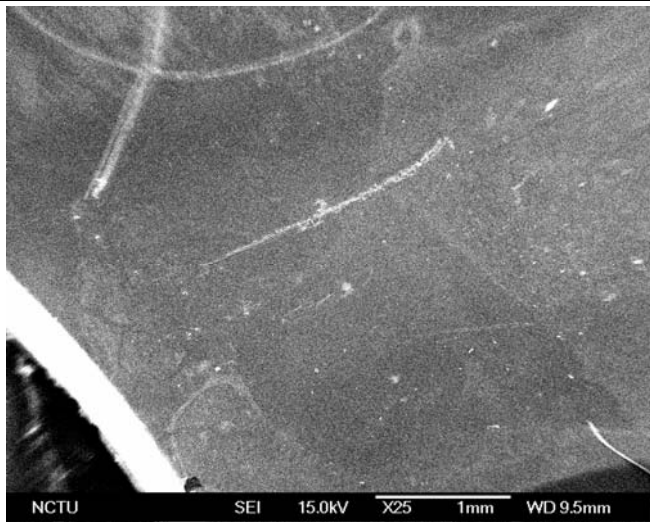
Specimen	D1	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Co	I	H ₂	100			30 torr	400 W	10 min	370°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter		II	H ₂	50	CH ₄	5	16 torr	800W	6 min	580°C



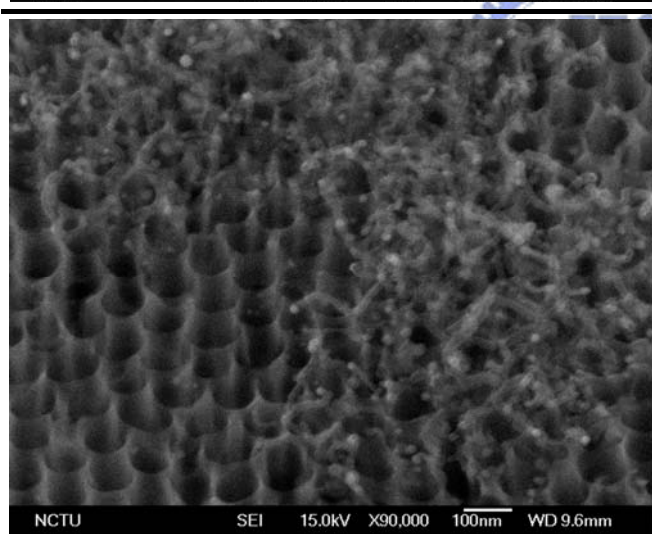
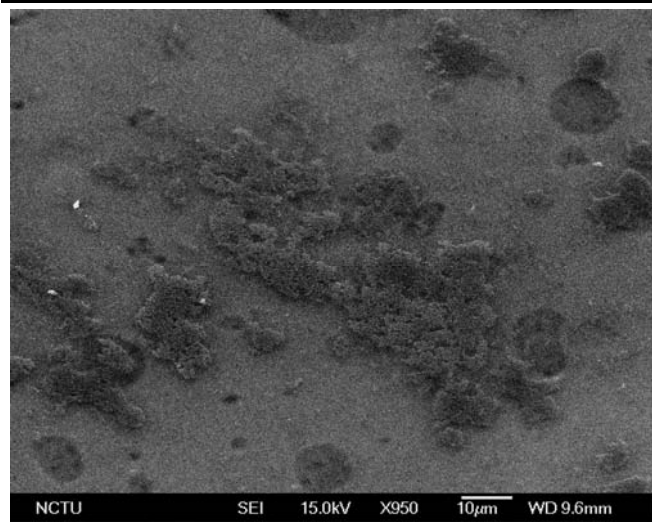
Specimen	D2	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Co	I	H ₂	100			30 torr	400 W	10 min	450°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter		II	H ₂	50	CH ₄	5	20 torr	800W	6 min	590°C



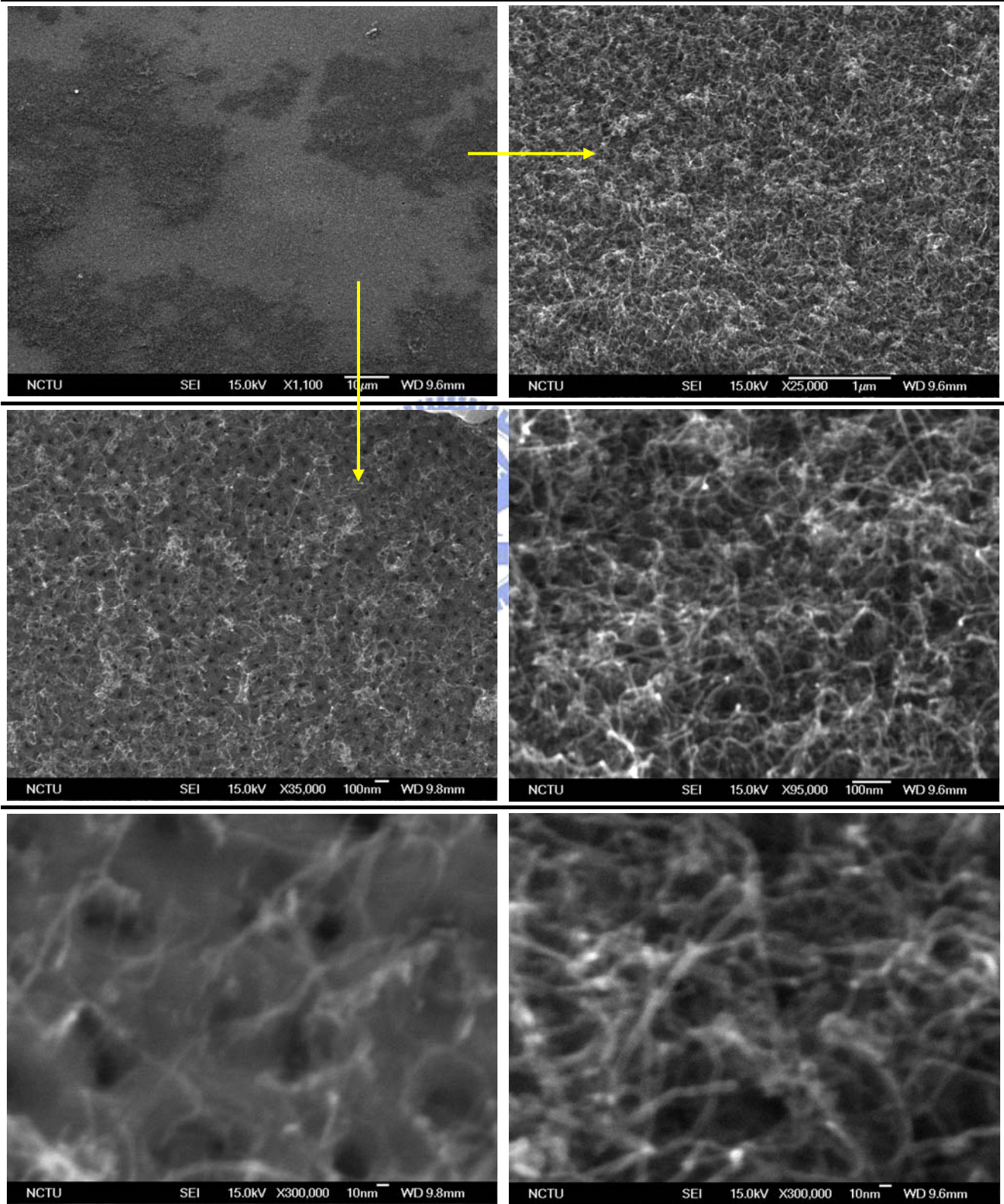
Specimen	D3	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Co	I	H ₂	100			30 torr	400 W	10 min	460°C
Substrate	Si	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter		II	H ₂	50	CH ₄	5	24 torr	800W	6 min	600°C



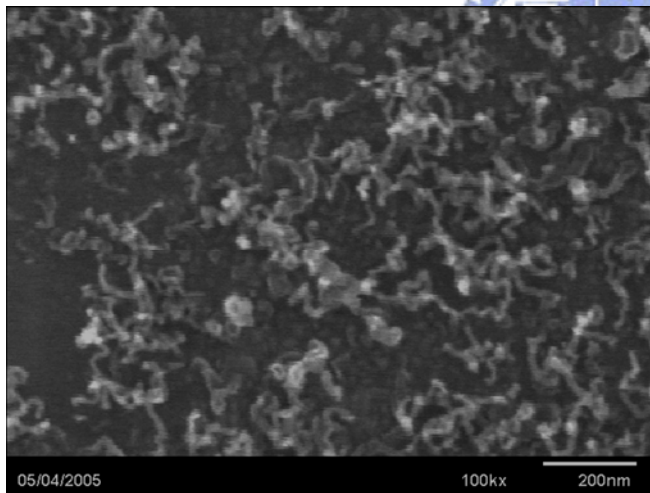
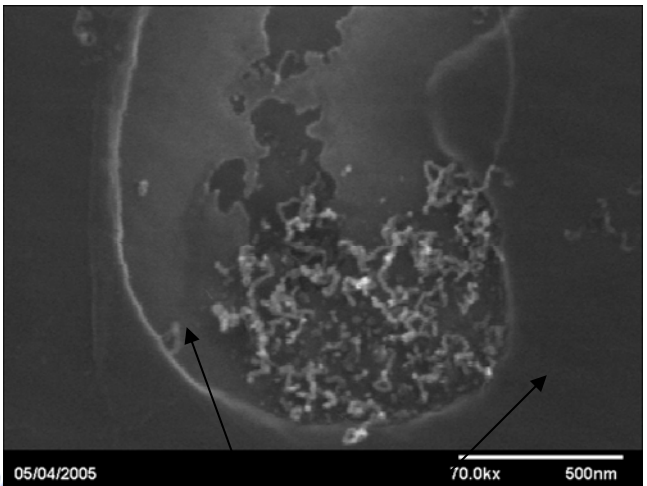
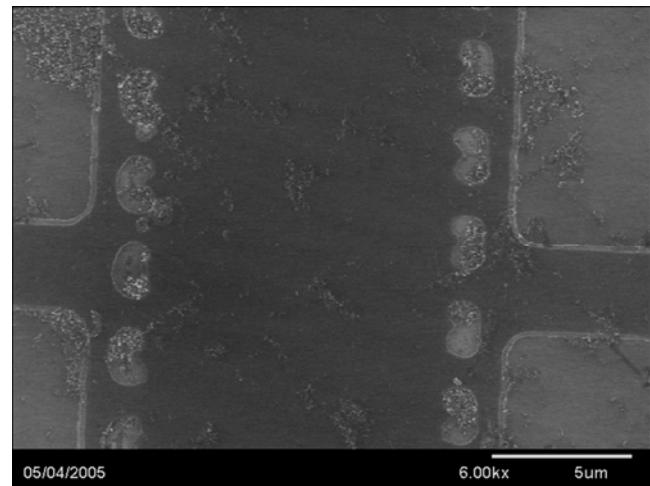
Specimen	E1	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Co	I	H ₂	100			30 torr	400 W	10 min	450°C
Substrate	AAO	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	14~17	II	H ₂	50	CH ₄	5	20 torr	800W	6 min	590°C



Specimen	E2	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Fe	I	H ₂	100			30 torr	400 W	10 min	450°C
Substrate	AAO	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	4.5~5.3	II	H ₂	50	CH ₄	5	20 torr	800W	6 min	590°C



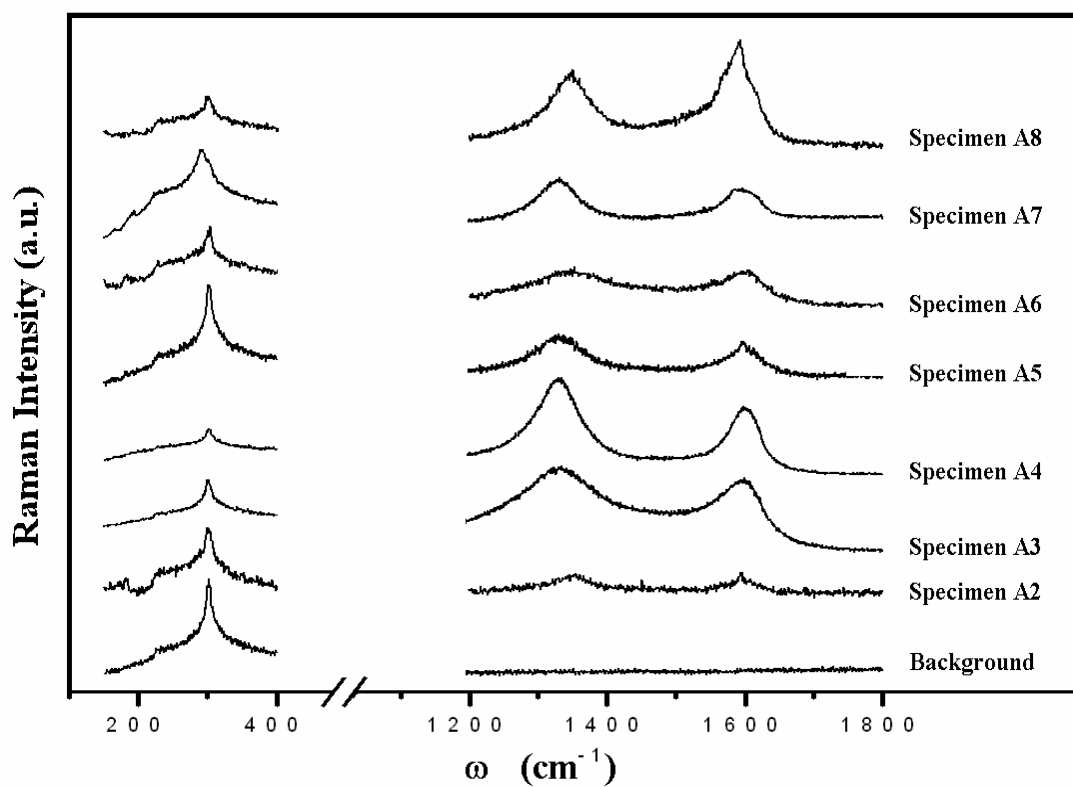
Specimen	F1	Step	Gas (sccm)				Pres	Power	Time	Temp
Catalyst	Co	I	H ₂	100			30 torr	400 W	10 min	400°C
Substrate	a:Si/Si ₃ N ₄	Step	Gas (sccm)				Pres	Power	Time	Temp
Diameter	8~12	II	H ₂	50	CH ₄	5	24 torr	800W	6 min	589°C



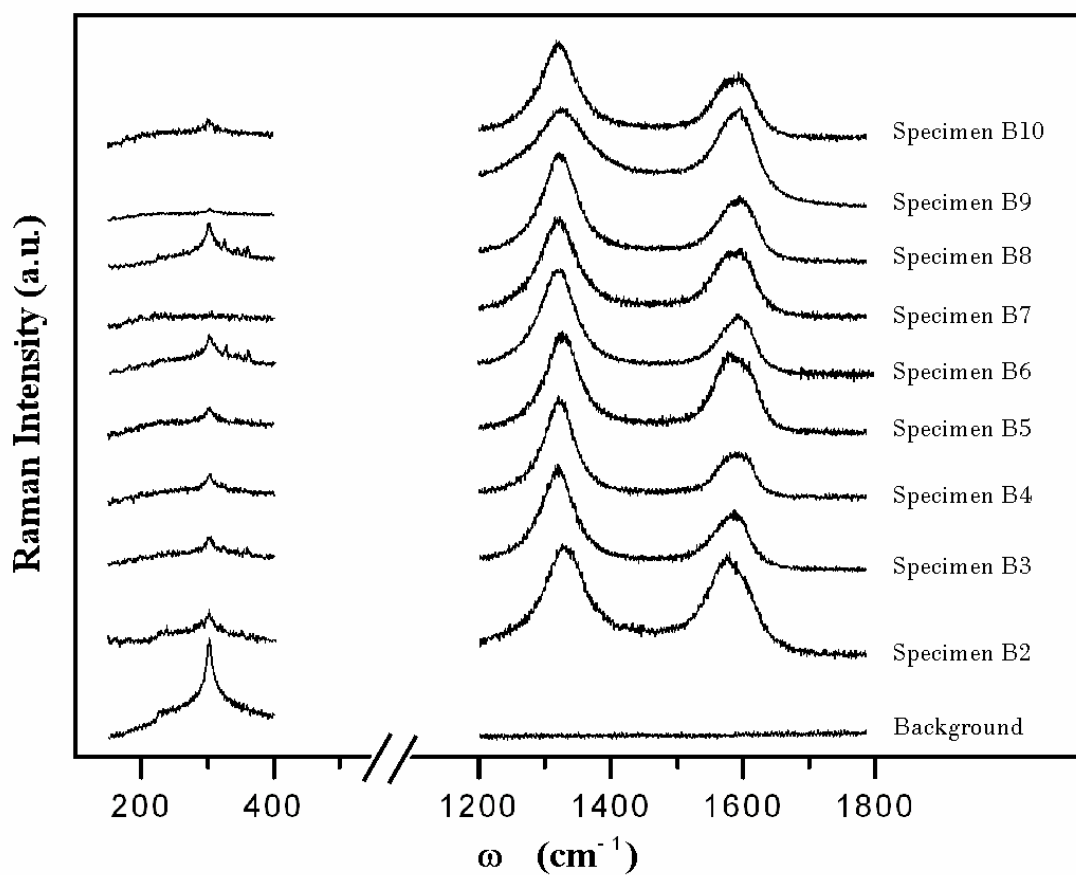
1. 編號 A 系列的鈷觸媒輔助成長之碳奈米管拉曼光譜圖表
2. 編號 B 系列的鐵觸媒輔助成長之碳奈米管拉曼光譜圖表
3. 編號 C 系列的鎳觸媒輔助成長之碳奈米管拉曼光譜圖表



1. 編號 A 系列的鈷觸媒輔助成長之碳奈米管拉曼光譜圖表



2. 編號 B 系列的鐵觸媒輔助成長之碳奈米管拉曼光譜圖表



3. 編號 C 系列的鎳觸媒輔助成長之碳奈米管拉曼光譜圖表

