

Supporting information

Emergence of Interstitial-Atom-Free HCP Nickel Phase during the Thermal Decomposition of Ni_3C Nanoparticles

Ray-Tung Chiang,^{†,‡} Ray-Kuang Chiang,^{†,} and Fuh-Sheng Shieu^{‡,*}*

[†]Nanomaterials Laboratory, Department of Materials Science and Engineering, Far East University, Hsing-Shih, Tainan 74448, Taiwan, and [‡]Department of Materials Science and Engineering, National Chung Hsing University, Taichung 402, Taiwan

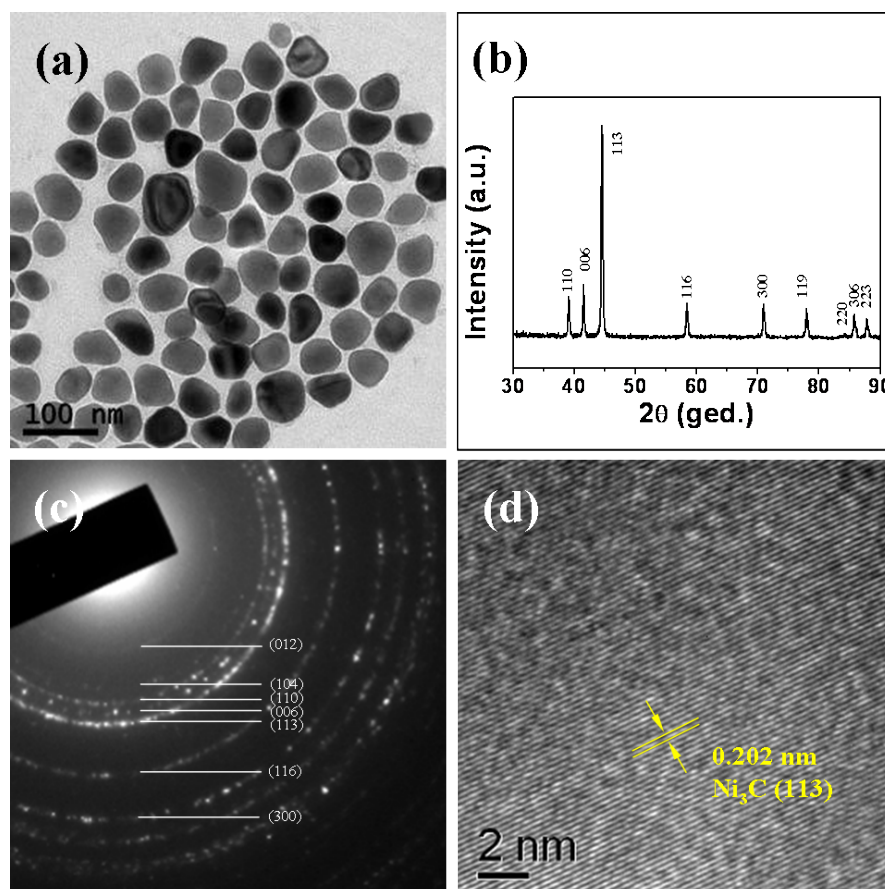


Figure S1. (a) TEM image, (b) XRD pattern, (c) SAED image, and (d) HR-TEM image of as-synthesized Ni_3C NPs.

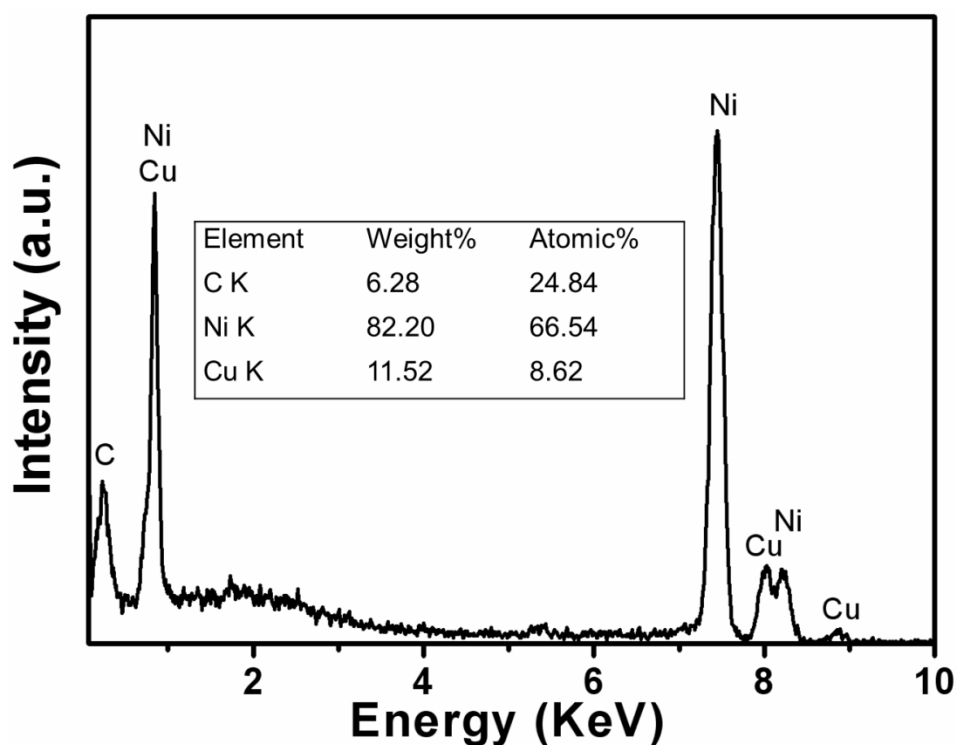


Figure S2. EDS spectrum of Ni_3C NP products decomposed at 500°C . (Note that the Cu elements and a small number of the C elements, originate from the carbon-coated copper grid used in the TEM process.)

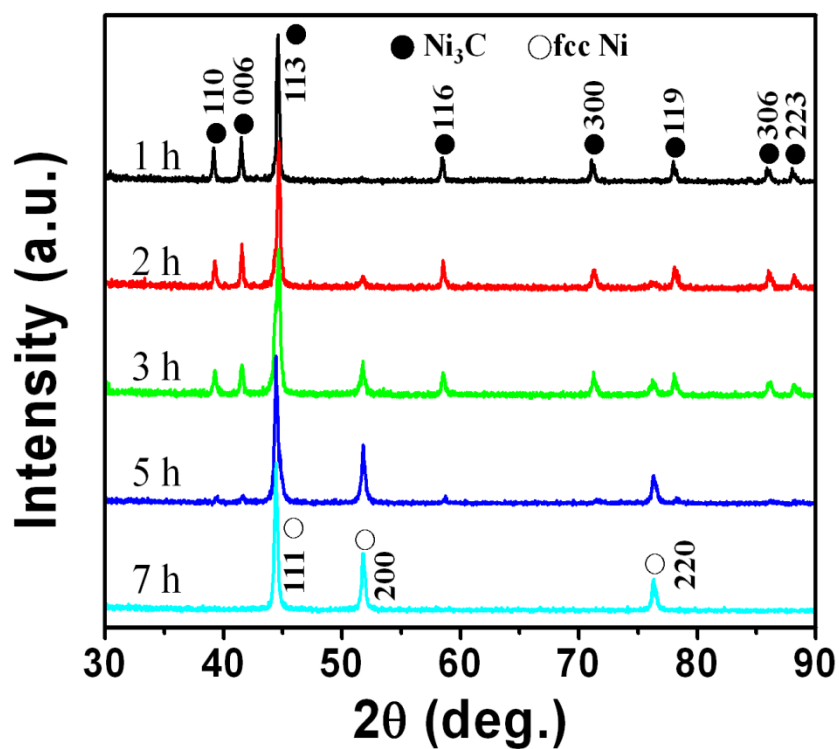


Figure S3. XRD spectra of Ni_3C NP products decomposed at 300°C for times ranging from 1 - 7 h.

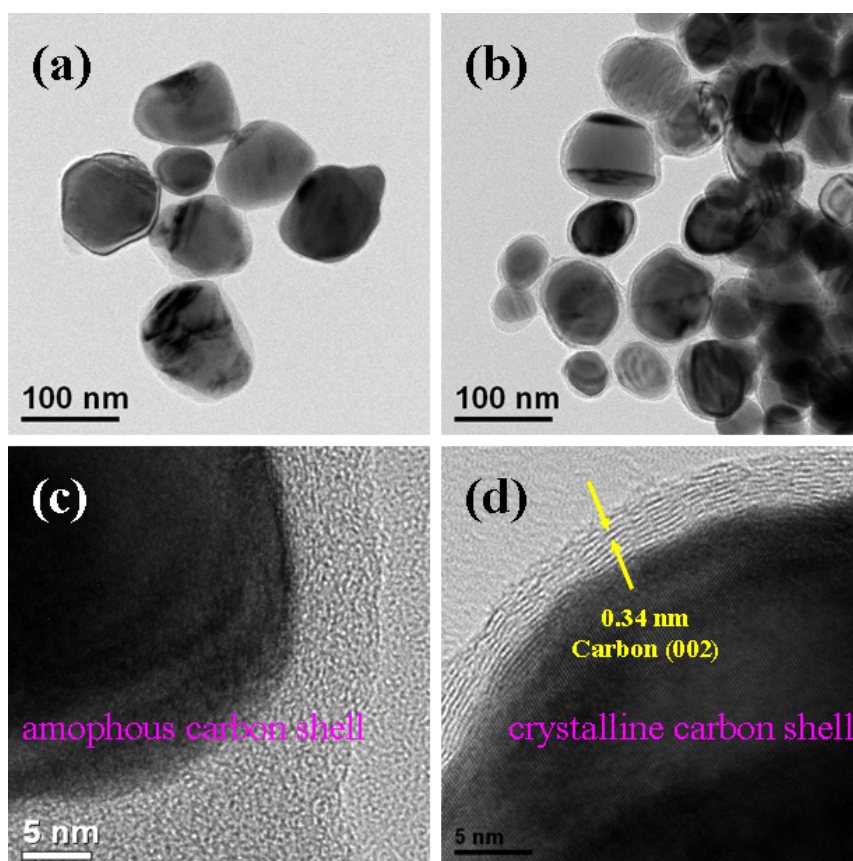


Figure S4. TEM (upper) and HR-TEM (lower) images of Ni_3C NP products decomposed at temperatures of: (a,c) 300°C and (b,d) 500°C for 3 h.

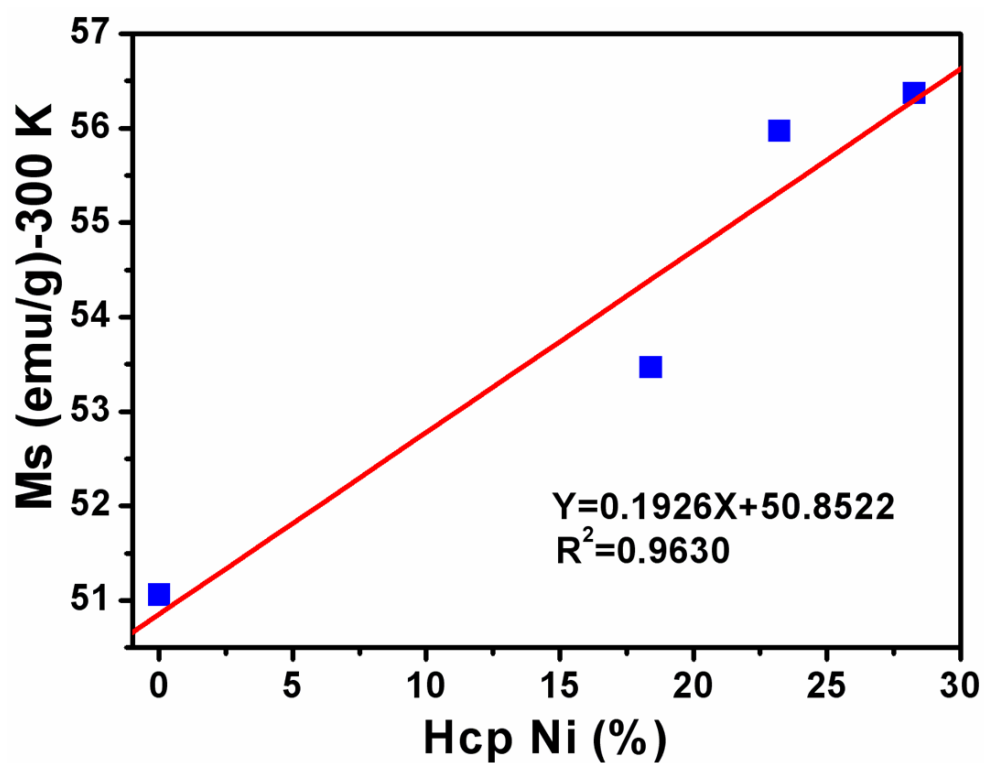


Figure S5. Linear fit of M_s values of decomposed samples with different IAF HCP phase contents.

Table S1. Relative contents of HCP Ni and FCC Ni in Ni₃C NP products annealed at temperatures of: 500°C or 800°C.

Samples (decompose)	500°C-0min	500°C-1hr	500°C-2hr	500°C-3hr	500°C-5hr	500°C-7hr	800°C-0min
hcp Ni (%)	28.28	23.22	20.69	18.41	11.99	3.87	0
fcc Ni(%)	71.72	76.78	79.31	81.59	88.01	96.13	100

Table S2. Magnetic properties of samples shown in Figure 7.

	300K			5K		
Samples	Ms (emu/g)	Mr	Hc (Oe)	Ms (emu/g)	Mr	Hc (Oe)
500 °C-0min	56.37	6.32	74.53	59.40	10.85	123.33
500 °C-1hr	55.97	5.63	63.58	58.55	10.78	117.27
500 °C-3hr	53.47	5.87	62.46	56.42	9.54	102.52
800 °C-0min	51.06	3.36	39.83	54.50	6.34	89.90