Synthesis of Ni nanoparticles (fcc/hcp) through supercritical solvothermal synthesis

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Magnetic materials have various applications in magnetic memory, spintronics, and biomedical field. Previously, various methods for synthesis of Ni nanoparticles, one of magetic matertials, are investigated such as non-aqeous sol-gel process or thermal decomposition. However, most of methods for synthesis of Ni nanoparticles produce fcc(face-centered-cubic) structure Ni. The other structure of Ni, hcp(hexagonal close-packed) Ni is less stable than fcc Ni and it is difficult to control crystal phase of Ni particles.
In this study, Ni nanoparticles were synthsized by solvothermal synthesis using supercritical methanol. The crystalline structure of Ni was controlled by changing precusors of Ni. Fcc Ni can be synthesized when Ni precusors are Ni(OH)2 and hcp Ni can be synthesized when Ni precusors are Ni(CH3COO)2. Synthesized Ni particles were characterised by field emission scanning electron microscopy (FE-SEM), powder X-ray diffraction (XRD), and superconducting quantum interference device (SQUID).