

### Synthesis of cobalt and nickel nanoparticles in supercritical methanol

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Cobalt nanoparticles with an fcc structure and nickel nanoparticles with fcc and hcp structures were synthesized by the reduction of  $\text{Co}(\text{NO}_3)_2$  and  $\text{Ni}(\text{NO}_3)_2$  in supercritical methanol. The reduction of  $\text{Co}^{2+}$  and  $\text{Ni}^{2+}$  to Co and Ni was completed within 15 min at 400 °C and 300 bar. The reduction mechanism was investigated by varying the reaction temperature (200–400 °C) and the reaction time (0.5–15 min). The results suggested that cobalt methoxynitrate formed at an initial stage was converted to CoO, and then reduced to Co. In addition, an introduction of oleic acid as a stabilizer achieved the formation of Co nanoparticles (~10 nm). In the case of Ni, The reduction of  $\text{Ni}^{2+}$  to Ni showed similar mechanism to the formation of Co, It was also observed that starting materials ( $\text{Ni}(\text{OH})_2$  and  $\text{Ni}(\text{CH}_3\text{COO})_2$ ) affected the crystalline structure of Ni.