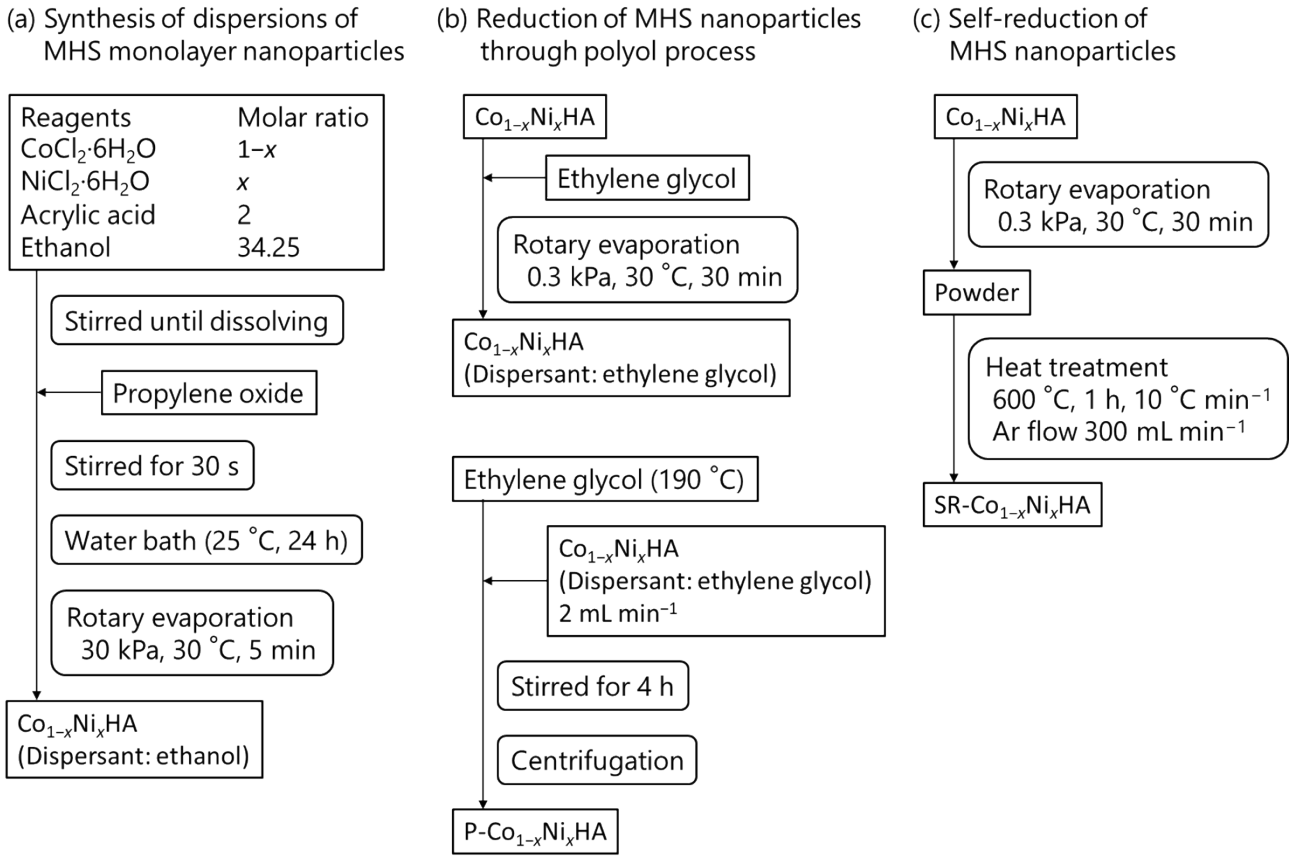
Supplementary Information

Thermal self-reduction of metal hydroxide salt monolayer nanoparticles leads formation of nanoparticulate and porous structured alloys.

Naoki Tarutani,[a,b] Yuka Hiragi,[a] Kengo Akashi, [a] Kiyofumi Katagiri,[a] and Kei Inumaru[a]*

[a] Applied Chemistry Program, Graduate School of Advanced Science and Engineering, Hiroshima University, 1-4-1 Kagamiyama, Higashi-Hiroshima, Hiroshima 739-8527, Japan.
[b] Research Center for Micro-Nano Technology, Hosei University, 3-11-15 Midori-cho, Koganei, Tokyo 184-8584, Japan.



Scheme S1 Synthetic steps of (a) dispersions of MHS nanoparticles, (b) reduction of MHS nanoparticles through polyol process, and (c) self-reduction of MHS nanoparticles.

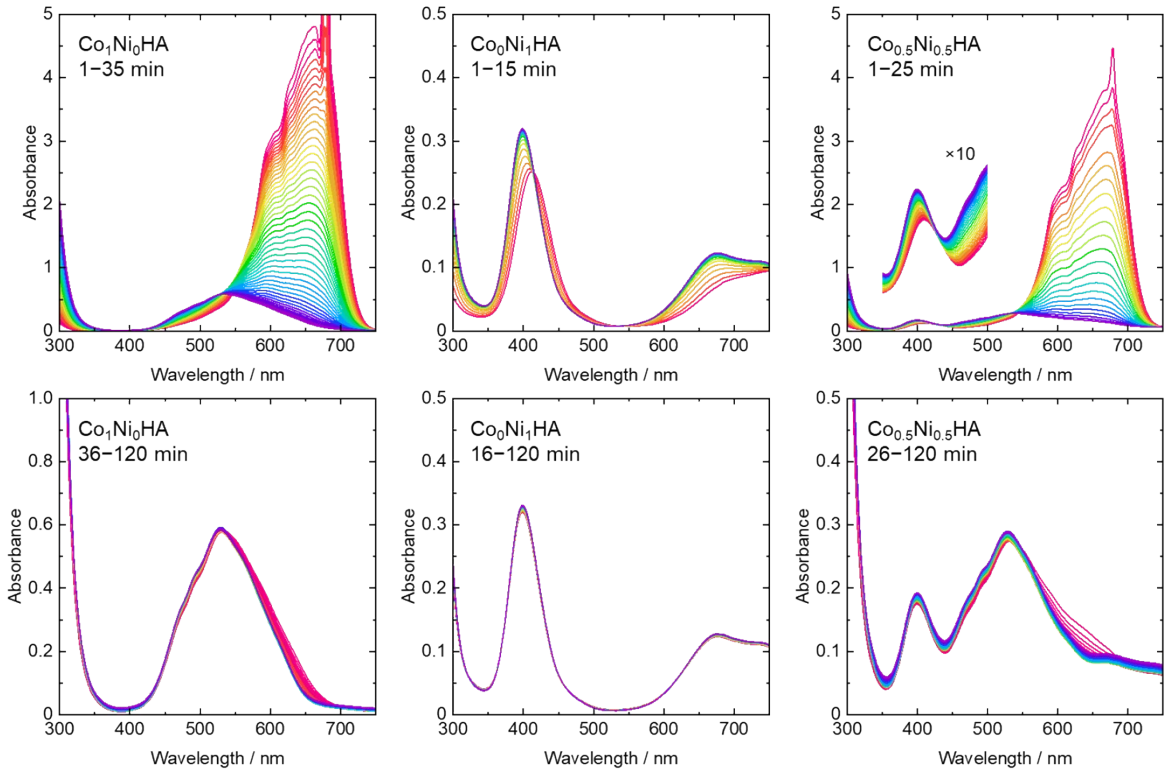


Fig. S1 UV-Vis spectra of Co_1Ni_0HA, Co_0Ni_1HA, and $Co_{0.5}Ni_{0.5}HA$ after addition of PO (time resolution of 1 min).

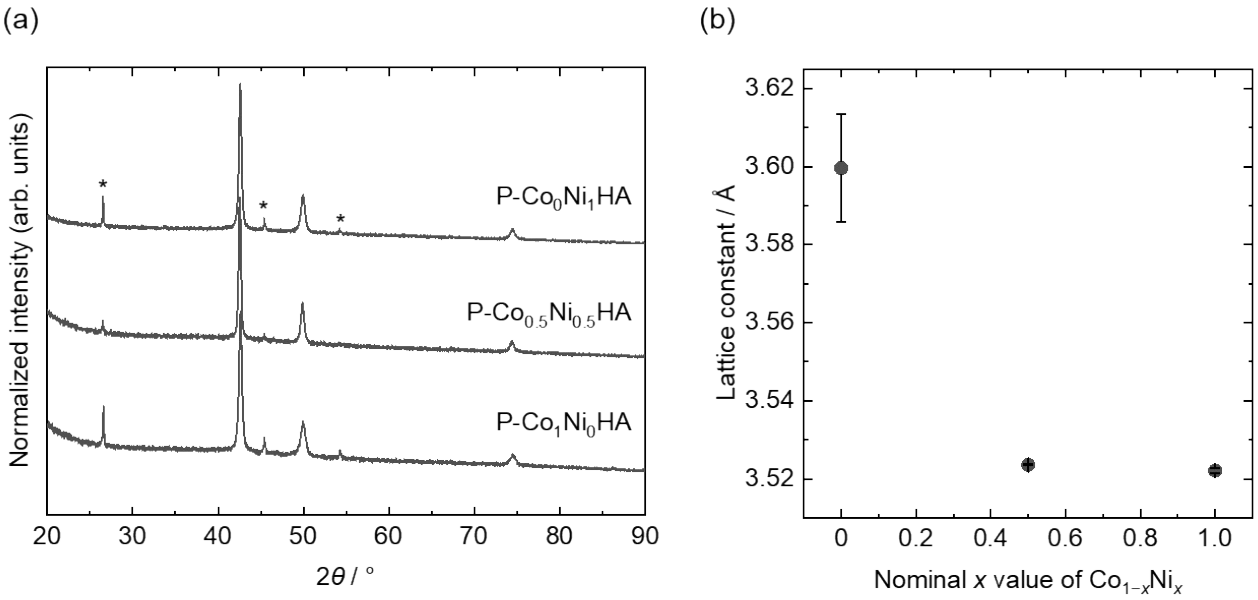


Fig. S2 (a) XRD patterns and (b) calculated lattice constants of P-Co_1Ni_0HA, P-Co_0Ni_1HA, and P-$Co_{0.5}Ni_{0.5}HA$. * Si reference.

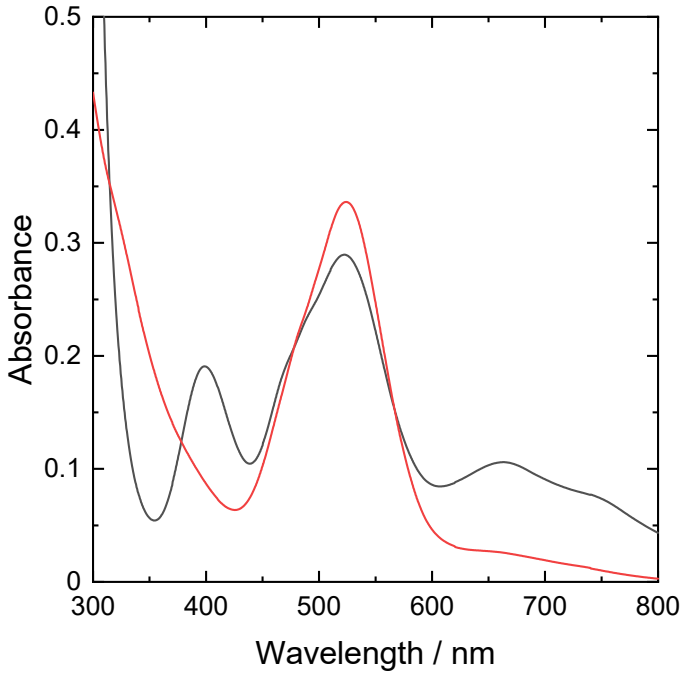


Fig. S3 UV-Vis spectra of patterns of $Co_{0.5}Ni_{0.5}HA$ dispersed solution before (black) and after (red) polyol process.

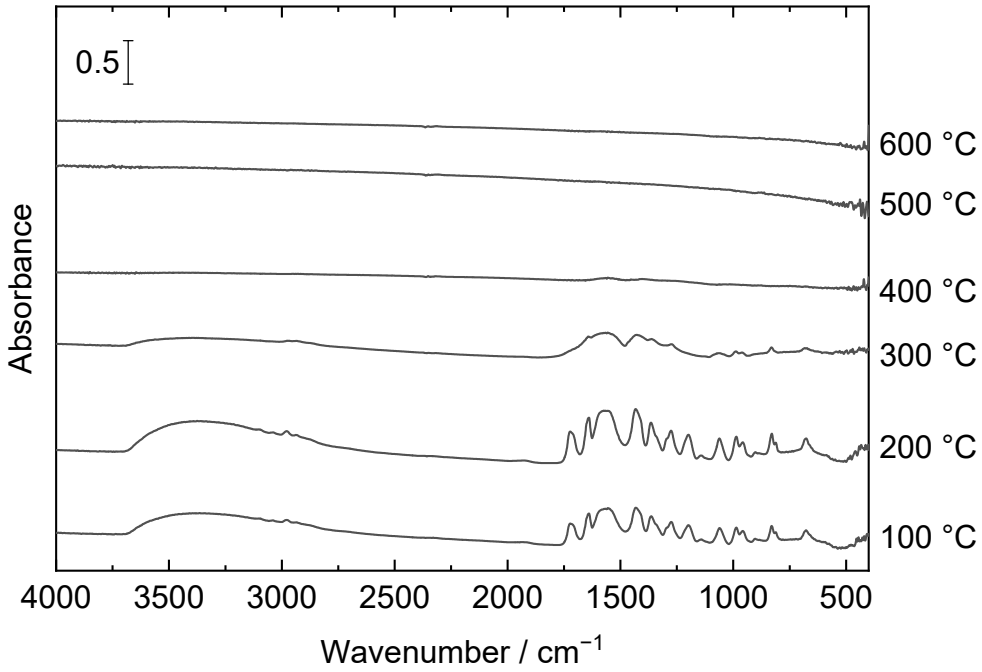


Fig. S4 IR spectra of Co_0Ni_1HA after heat-treatment at 100–600 °C without holding the temperature.

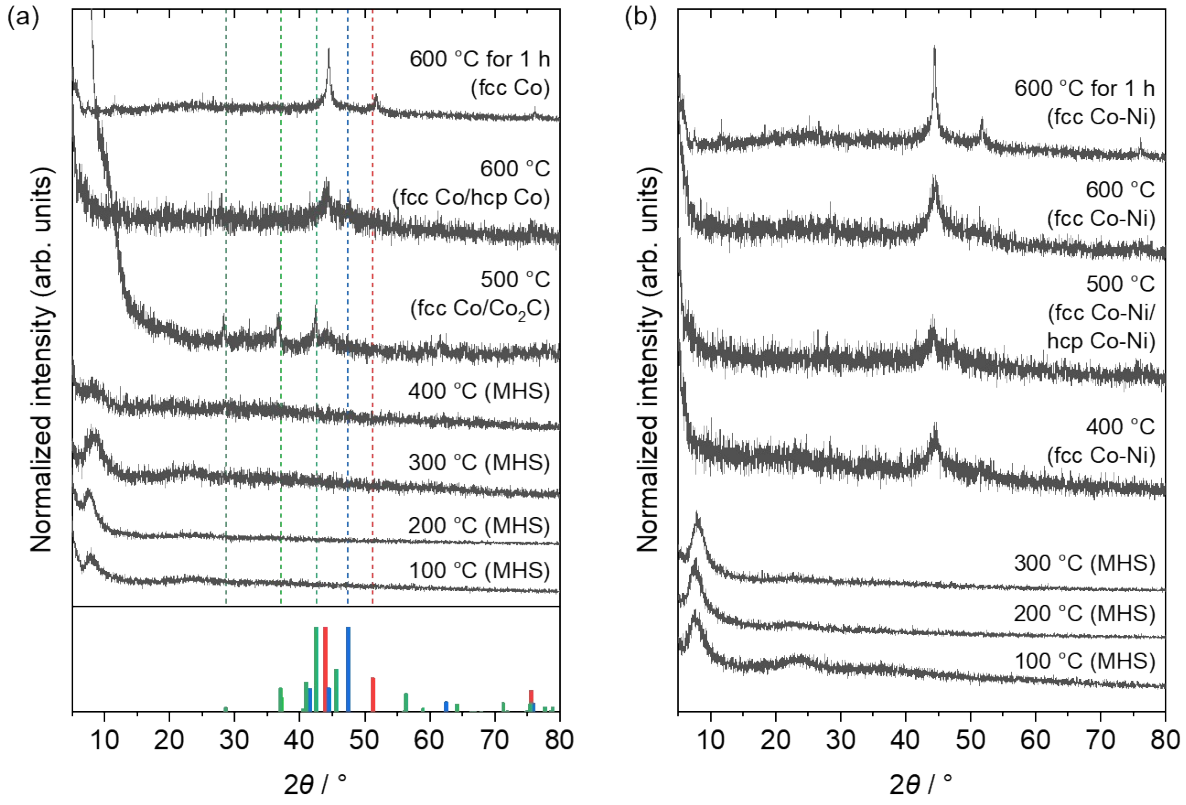


Fig. S5 XRD patterns of (a) Co_0Ni_1HA and (b) $Co_{0.5}Ni_{0.5}HA$ after heat-treatment at 100−600 °C without holding the temperature. The red, blue, and green bars in (a) are fcc Co (JCPDS #15-0806), hcp Co (#89-7373), and Co_2C (# 65-8206).

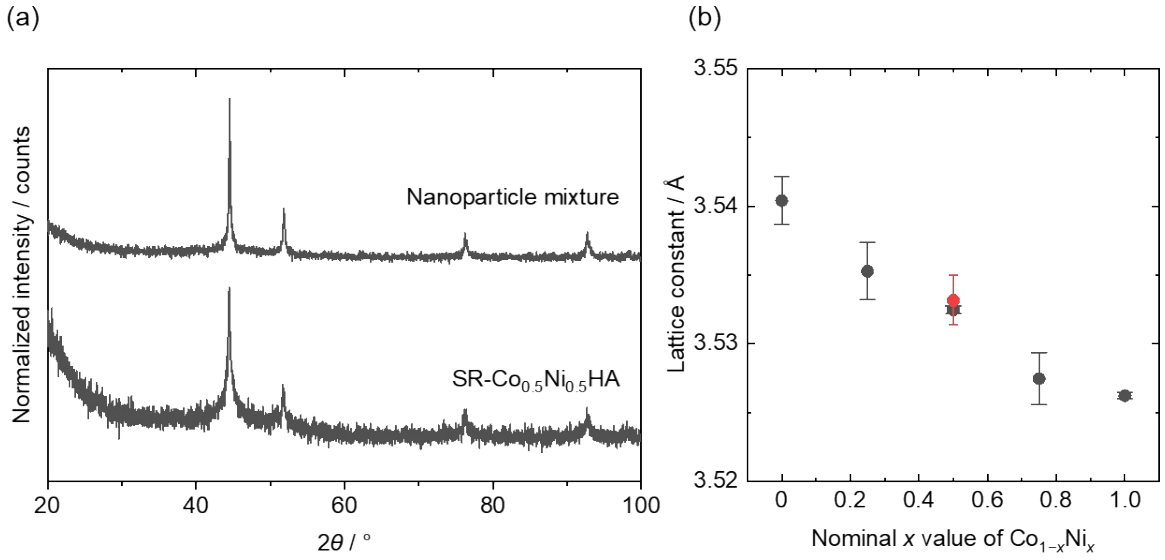


Fig. S6 (a) XRD patterns of SR-$Co_{0.5}Ni_{0.5}HA$ and heat-treated nanoparticle mixture of Co_1Ni_0HA and Co_0Ni_1HA. (b) Lattice constants of SR-$Co_{1-x}Ni_xHA$ (x = 0, 0.25, 0.5, 0.75, 1) (black) and heat-treated nanoparticle mixture of Co_1Ni_0HA and Co_0Ni_1HA (red).

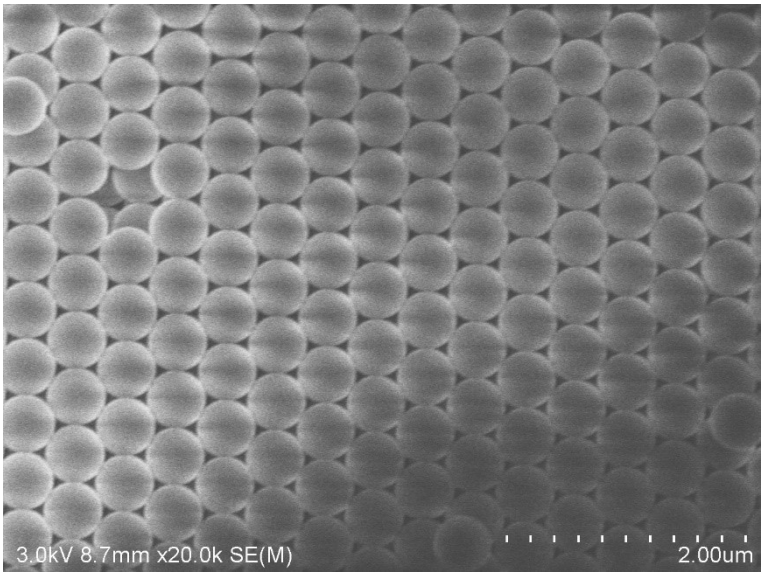


Fig. S7 SEM image of polystyrene microparticle template.