Supporting information for

Intense Femtosecond Laser Mediated Electrical Discharge Enables Preparation of Amorphous Nickel Phosphide Nanoparticles

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Figure S1

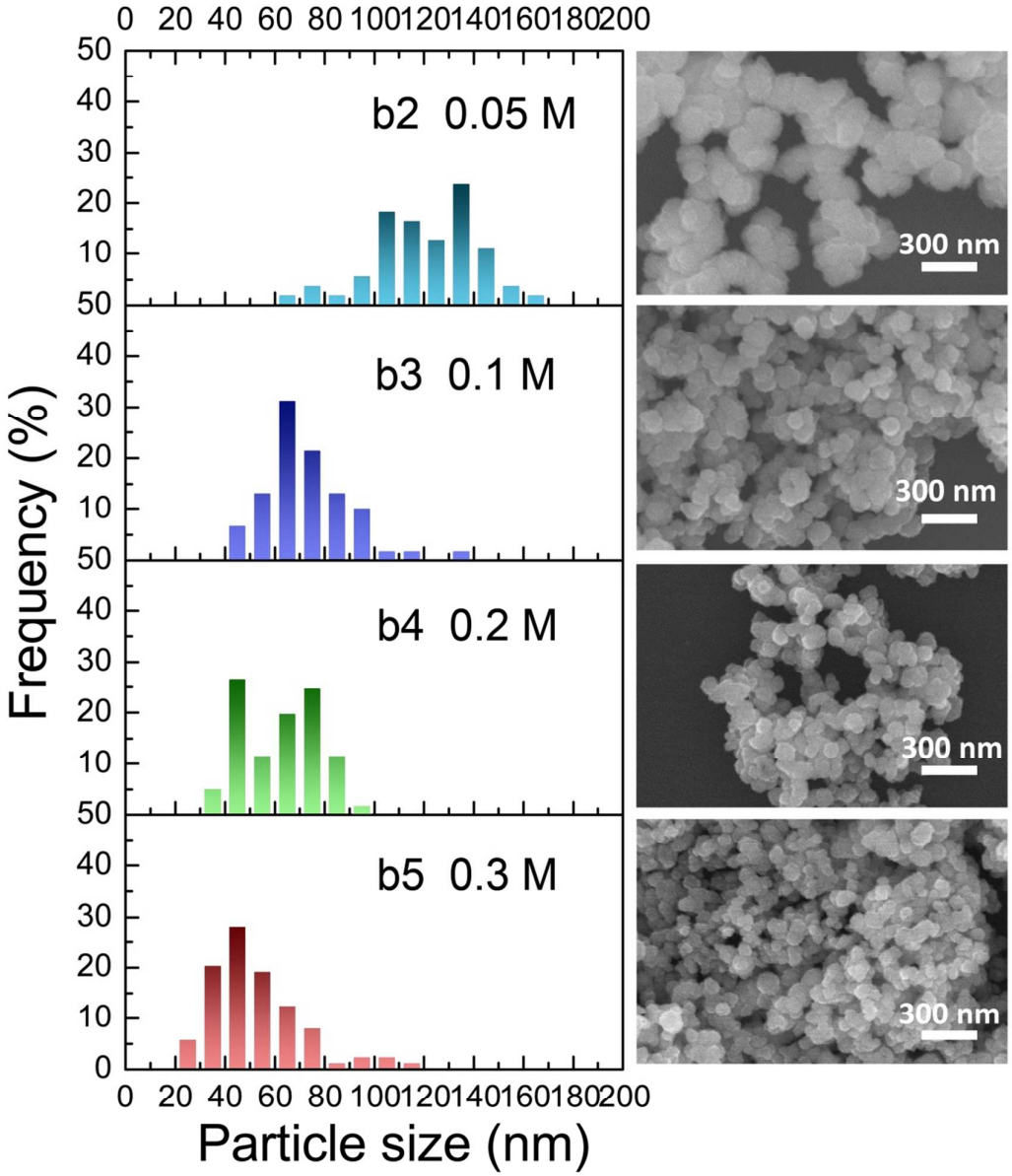

Figure S1. Dependence of the Ni-P nanoparticle size distribution on nickel ion concentration (0.05 M, 0.1 M, 0.2 M, and 0.3 M).

A group of samples with varying nickel ion concentrations (0.05 M, 0.1 M, 0.2 M, and 0.3 M) were irradiated by femtosecond laser while keeping the reactant ratio as 1:3, laser power 1 W, and irradiation time 10 minutes. The as-formed nanoparticles are shown in Figure S1. In all these conditions, the sample solutions turned turbid and black promptly in several minutes except for the one with 0.01 M nickel ion. Thus,

the reactant concentration threshold of this laser induced synthesis reaction might be around 0.01 M. It can be observed that the nanoparticle average sizes decreased from about 140 nm to 40 nm when the nickel ion concentration increased from 0.05 M to 0.3 M. This means that smaller Ni-P nanoparticles were formed in sample solutions with higher nickel ion concentrations.

Figure S2

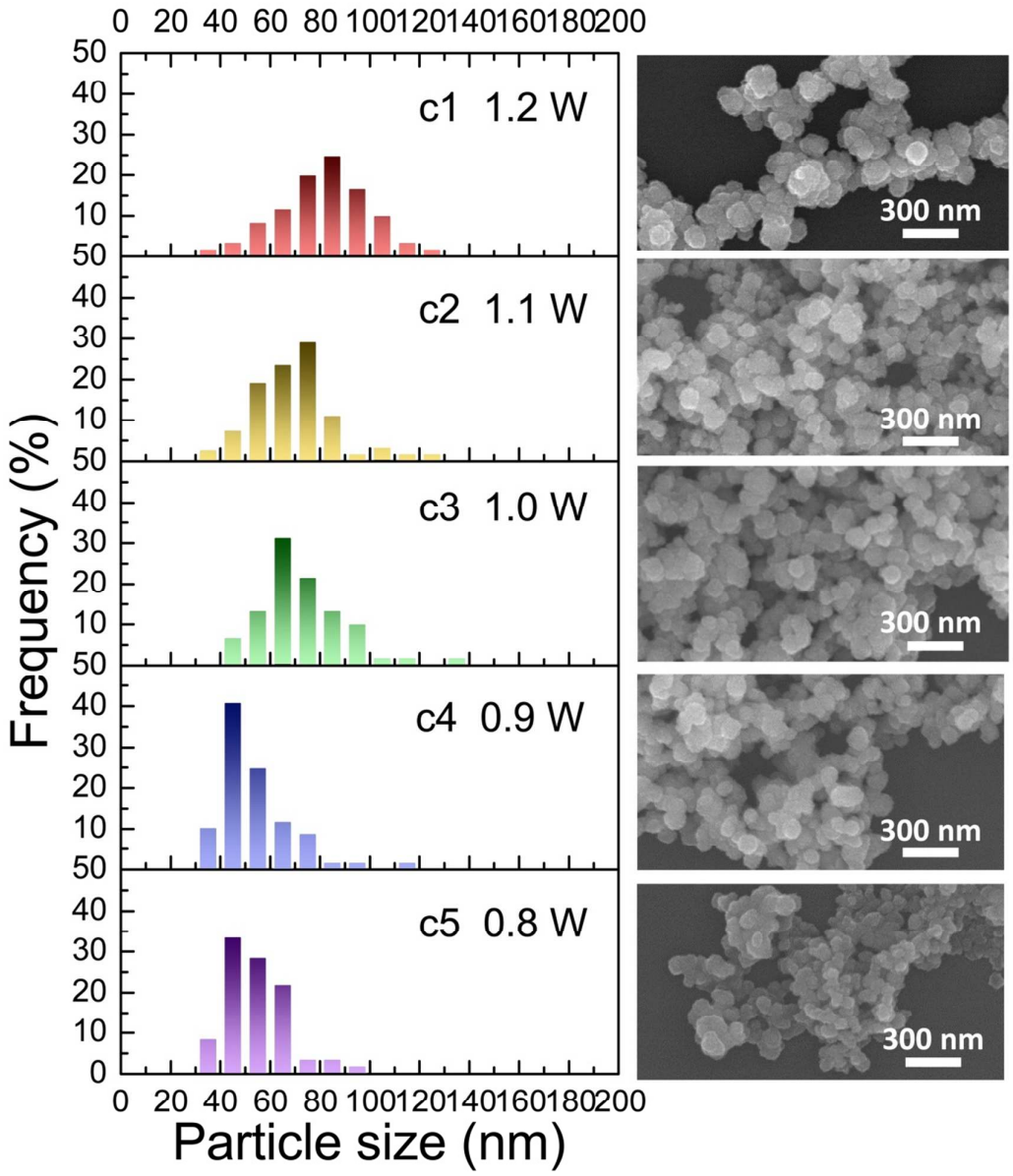

Figure S2. Dependence of the Ni-P nanoparticle size distribution on the excitation laser power.

By varying the excitation laser power from 1.2 W to 0.8 W, also the nanoparticle average sizes could be adjusted from 80 nm to 40 nm easily, as shown in Figure S2. In this procedure, the reactant ratio was kept as 1:3, the nickel ion concentration was 0.1 M, and the irradiation time was 10 minutes. Obviously, the size distribution became narrower when decreasing laser power, what's more, the homogeneity of the

nanoparticles was also improved.

Figure S3

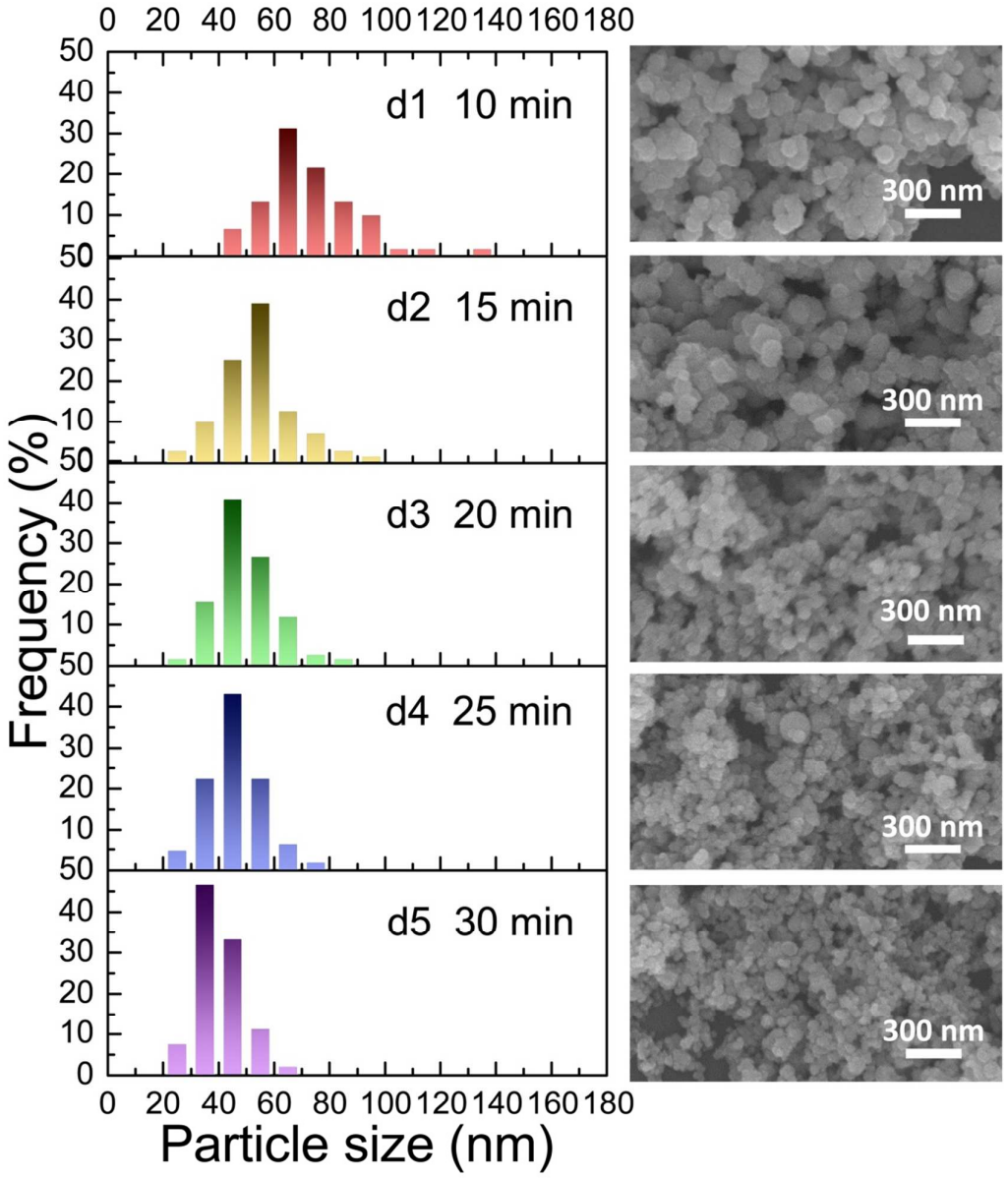

Figure S3. Dependence of the Ni-P nanoparticle size distribution on the laser irradiation time.

When the irradiation time prolonged from 10 minutes to 30 minutes with an interval of 5 minutes, the average size distribution shifted from nearly 60 nm to 30 nm, as shown in Figure S3. In all these cases, the reactant ratio was 1:3, the nickel ion concentration was 0.1 M, and the laser power was 1 W.

Figure S4

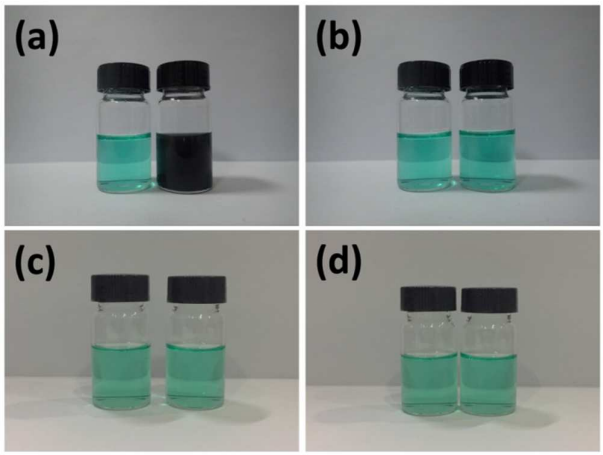

Figure S4. Contrast of solutions after laser irradiation with the stock solutions that suffered no laser irradiation. (a) The left solution is stock solution and the right one is irradiated by the focused femtosecond laser for 10 minutes; (b) The left solution is stock solution and the right one is irradiated by unfocused laser for one hour; (c) The left solution is stock solution and the right one is irradiated by 808 nm CW laser for one hour; (d) The left solution is stock solution and the right one is irradiated by 405 nm CW laser for one hour.