Supporting Information

Colloid-Assisted Growth of Metal-Organic Framework Nanoparticles

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SI.1. SEM images of the original PS nanocolloids

Fig. S1 shows the SEM images of the original PS nanocolloids used in this study with their size distributions. The results show that the original PS nanocolloids were spherical with the mean sizes of 31 and 78 nm, corresponding to **Figs. S1A** and **B**, respectively.

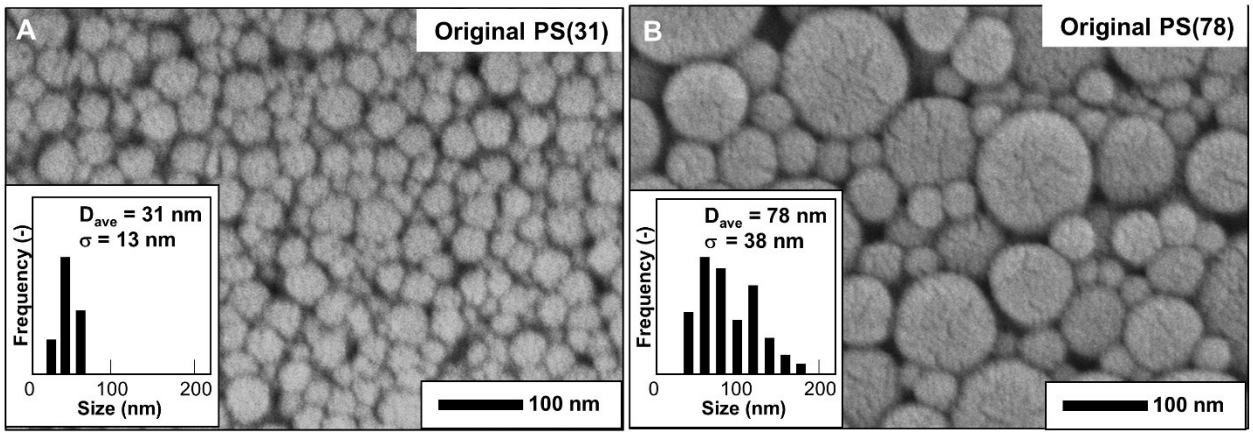

Fig. S1. High-magnified SEM images of original PS nanocolloids with mean sizes of 31 (A) and 78 nm (B). The insert image in the bottom-left side is the particle size distribution. The terms of D_{ave} and σ in the insert images are the average and the standard deviation of the particle size measured using the Feret analysis, respectively.

SI.2. Particle size and size distribution analysis

To measure the particle size and size distribution, the Feret method was used. 100 individual particles from the SEM images (see **Fig. S2**) were analyzed. The Feret analysis was conducted by following the steps as shown below:

(i) The sizes of individual particles were measured from the SEM image (see the original SEM image in **Fig. S2A**).

(ii) A boundary in the selected individual particle was then created (**Fig. S2B**). For example, as shown in **Fig. S2B**, we selected two types of particles, shown by red and orange boundaries.

(iii) To get an individual particle size, we took the longest distance between any two points along the selected boundary area as shown in **Fig. S2B**.

(iv) Average particle sizes and standard deviations were obtained using the following equations.

$$d_{av} = \frac{\sum d_{pi}}{N} \tag{1}$$

$$\sigma = \sqrt{\frac{\sum (d_{pi} - d_{av})^2}{N}} \tag{2}$$

where d_{av} and σ mean average particle size and standard deviation, d_{pi} and N are individual particle size and total particle number.

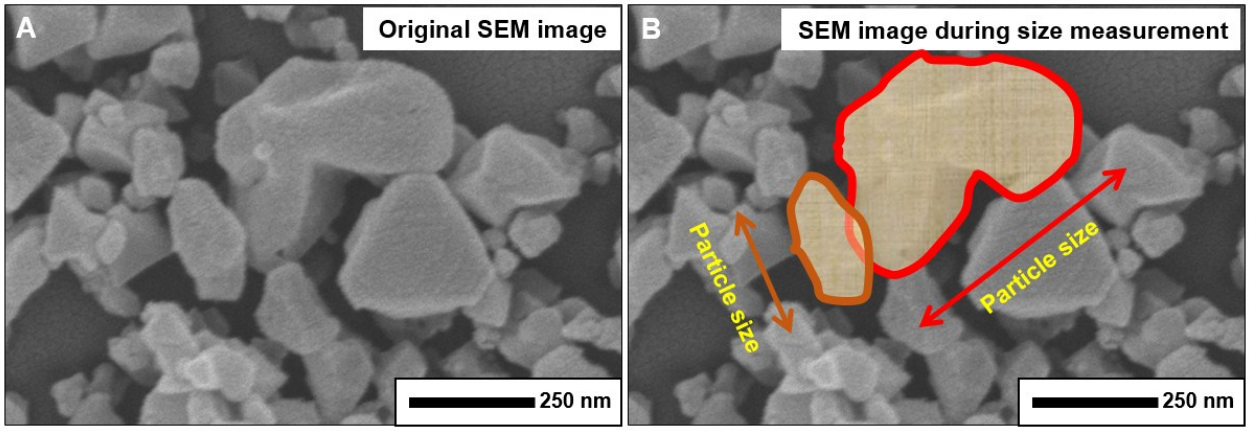

Fig. S2. (A) Original SEM image and (B) SEM image during the particle size measurements.

SI.3. Effects of size and amount of PS nanocolloids and chemical addition sequences

Figs. S3A and B show the SEM images of the MOFs prepared using a chemical addition sequence of PS nanocolloids, ligands, and metal ions with the mass ratio of PS colloids to metal ions of 0.20. **Figs. S3A and B** are samples prepared with PS nanocolloids with mean sizes of 78 and 31 nm, respectively. The results indicated that the samples contained mixed sizes, which are different from results shown in **Figs. 2C** and **D** in the **main manuscript**.

Fig. S3C shows the SEM image of MOFs prepared using the chemical addition sequence of 78-nm PS nanocolloids, metal ions, and ligands with the mass ratio of PS colloids to metal ions of 0.33. Different from results presented in **Fig. 2C** in **the main manuscript**, the result showed that most of the MOFs have sizes in the range of submicrometer. Although smaller particles with

sizes of about 40 nm were produced, they only exist with a small amount. This confirmed that there is an effect of additional metal ions prior to ligands on the formation of MOF nanoparticles.

Fig. S3D is the PXRD patterns of the samples shown in **Figs. S3A, B, and C**, which confirm that all samples have the same crystal phase of MIL-100(Fe).

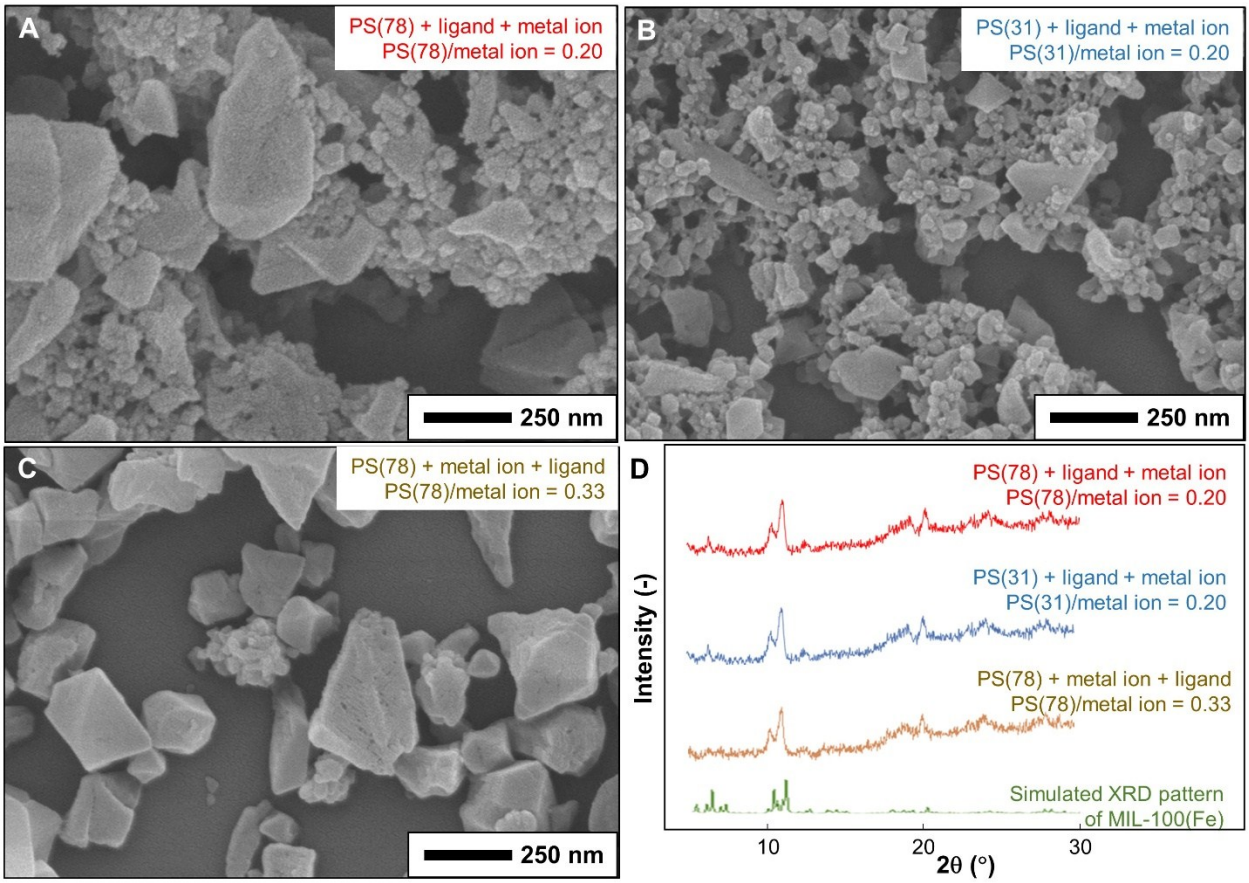

Fig. S3. SEM images (A, B, and C) and PXRD patterns (D) of the MOFs prepared with various sizes of PS nanocolloids and chemical addition sequences. (A) and (B) are for samples prepared using the chemical addition sequence of PS nanocolloids, ligands, and metal ions with the mass ratio of colloids to metal ions of 0.20, whereas (C) is for samples for sample prepared using the chemical addition sequence of PS nanocolloids, metal ions, and ligands with the mass ratio of colloids to metal ions of 0.33. (A) and (C) use 78-nm PS, whereas (B) utilizes 31-nm PS.