Supporting Information for *Cho et al*, "Self-assembly of lithographically patterned nanoparticles"

1. Fabrication process

Fabrication of 2D nets

On a <100> bare silicon wafer, 50 to 100 nm of an electron-beam (e-beam) resist, poly(methylmethacrylate) (PMMA, MW 950K A2) was spun and the wafer was baked at 185 °C for 3 minutes. An e-beam controlled by a RAITH system (Quantum v4.0) was used to pattern the resist. The resist was developed using an MIBK developer (1:3 = MIBK: IPA) for 35 seconds. Then, 0.4 nm chromium (Cr) and the desired thickness of Ni were deposited using a thermal evaporator. After evaporation, the resist was dissolved in acetone for lift-off metallization. A second step of e-beam lithography was performed in the same manner and the required thickness of Sn was thermally evaporated.

Fabrication of 2D nets with gold patterns

This process required three steps of e-beam lithography. On a silicon wafer, 5 nm thick Cr and 20 nm thick gold (Au) were patterned first using e-beam lithography and liftoff metallization. On top of the Au patterns, panels with 34 nm thick Ni and 54 nm thick Sn hinges were patterned.

Self-assembly

The samples were loaded in a planar etcher (Technics PEII-A) at a base pressure of 0.15 Torr. CF_4 and O_2 were flowed into the etcher for 3 minutes and the 25W RF power was applied for 40 – 100 seconds. Self-assembly occurred during this time period, after which the power was turned off, and the pressure in the etcher was slowly increased to 1 atm over a period of 5 minutes.
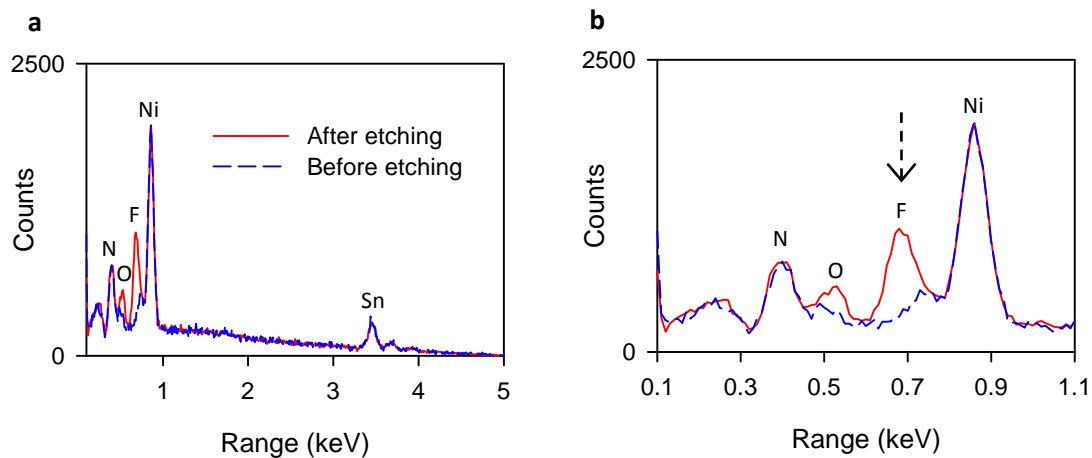
Figure S1. a, b, Energy dispersive spectroscopy (EDS) characterization of 50 nm thick Sn films deposited on patterned 10 micron and 200 nm thick square patterns of Ni on Si substrates, before and after etching with the CF$_4$ / O$_2$ plasma. a, After plasma etching with a 3.6 and 12 sccm flow rate of O$_2$ and CF$_4$ respectively for 2 minutes, approximately 12 % atomic concentration of fluorine (F) was observed within the reflowed Sn. **b,** Zoomed in EDS spectrum within the range of 0.1-1.1 KeV.