Supporting Information

A new magneto-optical phenomenon enhanced by Au nanoparticles on 3D Ni sub-microstructures

Chenxin Zhou[1†], Qingtong Wang[1], Changlin Dong[1], Jiajun Gu[1*], Di Zhang[1]

1. School of Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

†E-mail: zhouchenxin@sjtu.edu.cn

** E-mail: gujiajun@sjtu.edu.cn*

Determination of the maximum of localized surface plasmon resonance (LSPR) for Au nanoparticles (30 nm in size)

The molar concentration (C) of Au NPs in the stock colloid was estimated from the total amount of Au atoms in the solution and the average size of the NPs. We estimated the number of atoms in each NP using the following procedure. The volume of a sphere corresponding to the seed and the resultant particle were calculated, and the total number of atoms present in each volume was determined from the crystal structure of gold (cubic unit cell = 4.0786 Å with 4 gold atoms/unit cell). The number of particles in each sample were calculated by dividing the total number of gold atoms by the atoms/particle. This was converted to number of moles of particles/liter.

The extinction coefficient (ε = 11.3 × 10^7 M^{-1} cm^{-1}) for ~30 nm diameter Au NPs was calculated from Beer-Lambert's law:

$$A = \varepsilon C l \quad (1)$$

where A is the absorbance at the peak wavelength of the LSPR band and l (1 cm) is the path length of the solution in the spectrophotometry cuvette. The reflectance spectrum exhibits a characteristic LSPR maximum at 525 nm.

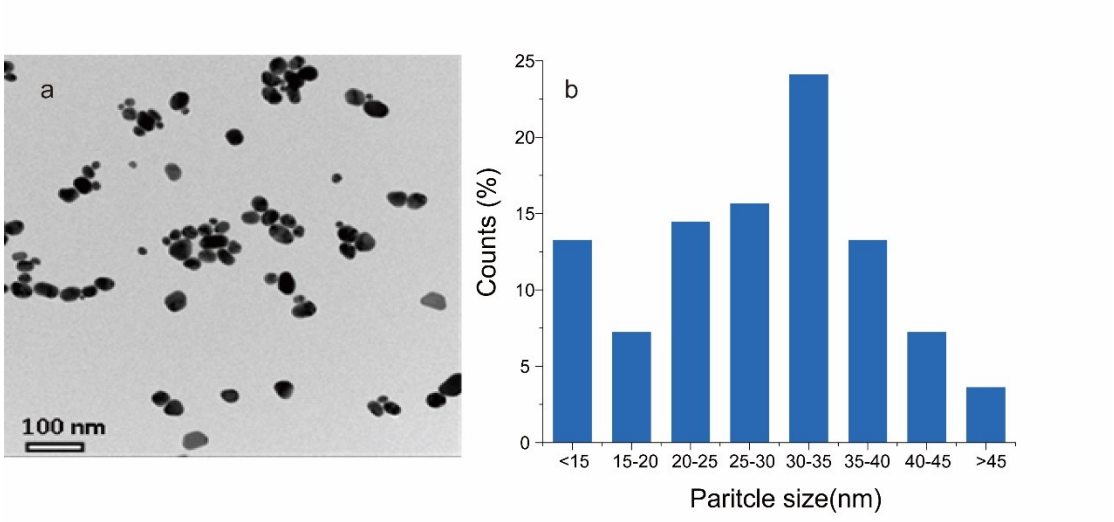

Fig. S1 a) TEM image of Au nanoparticles; b) Size distribution of Au nanoparticles. The average size is 28.85±9.68 nm.

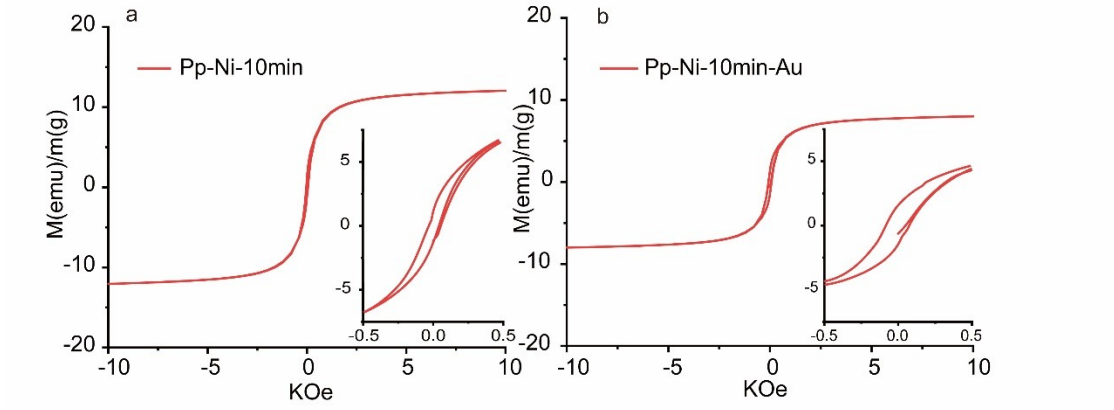

Fig. S2 Hysteresis loops of a) Pp-Ni BWs and b) Pp-Ni-Au30 BWs.

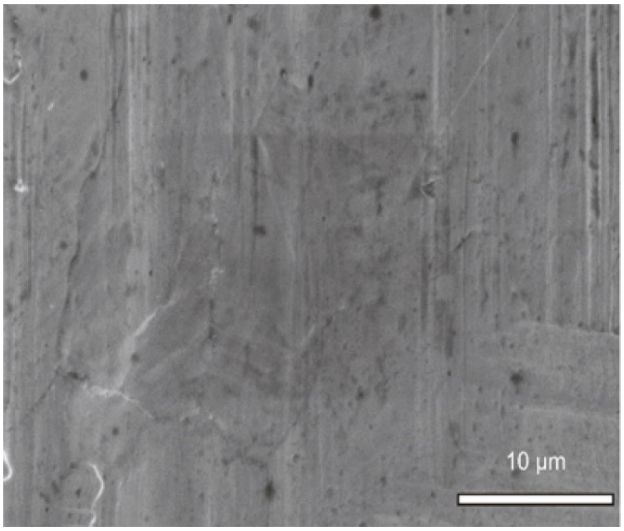

Fig. S3 SEM image of Ni-sheet.

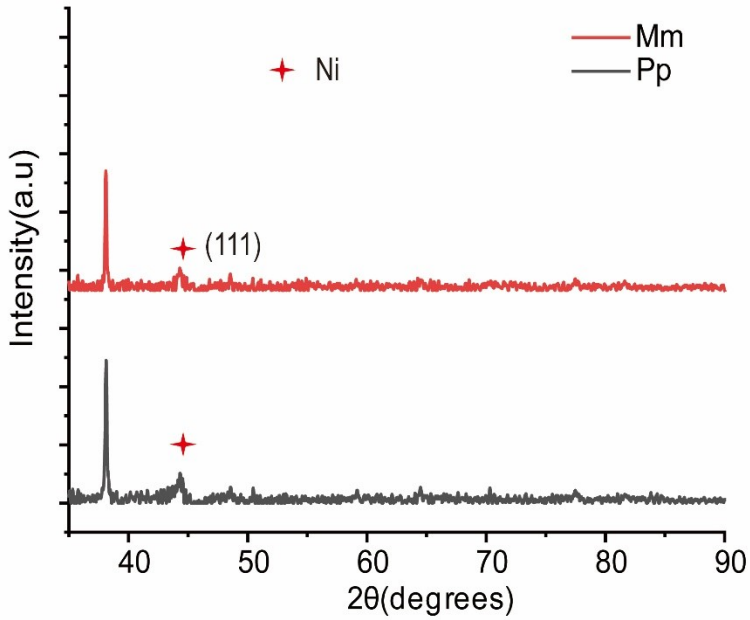

Fig. S4 XRD results of various Ni-BW samples.

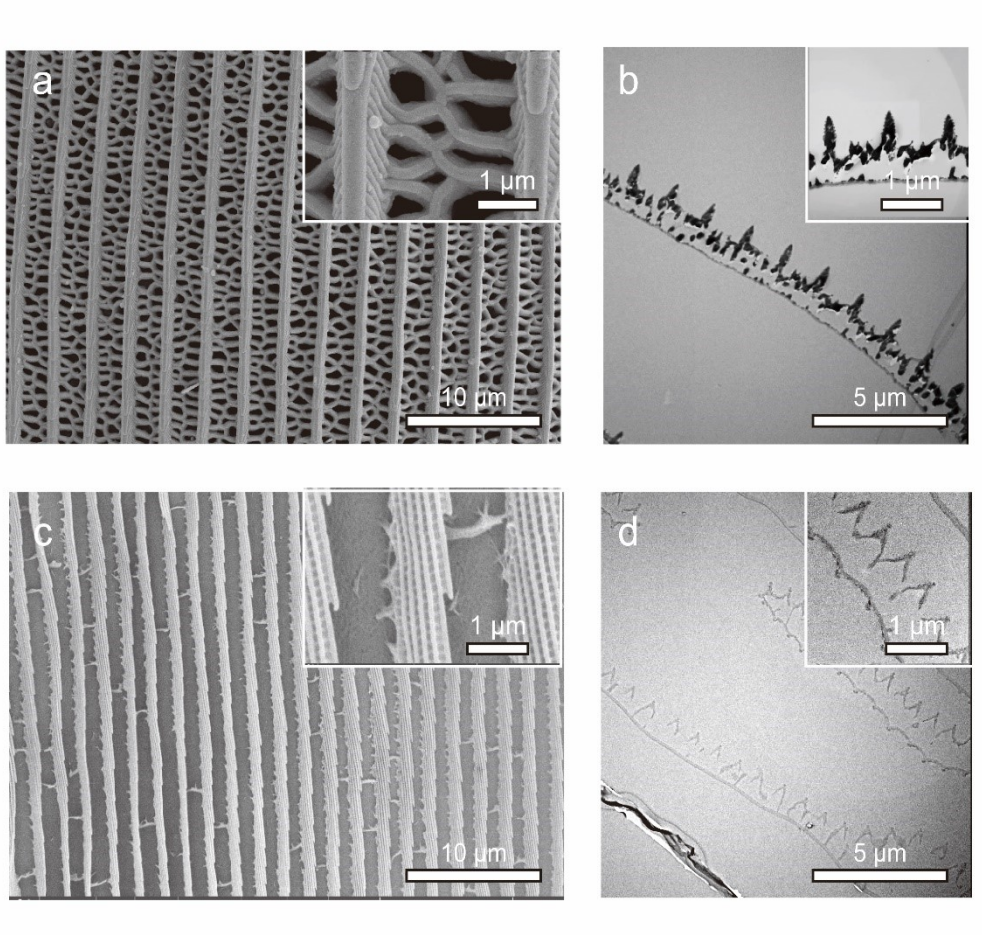

Fig. S5 a) SEM (top-view) and b) TEM (side-view) images of Pp-Ni-BWs. c) SEM (top-view) and d) TEM (side-view) images of Mm-Ni-BWs.