Electronic Supplementary Information (ESI)

'Painting' nanostructured metals ---playing with liquid metal

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Other supplementary materials for this manuscript include the following:

Movie S1

1.mp4

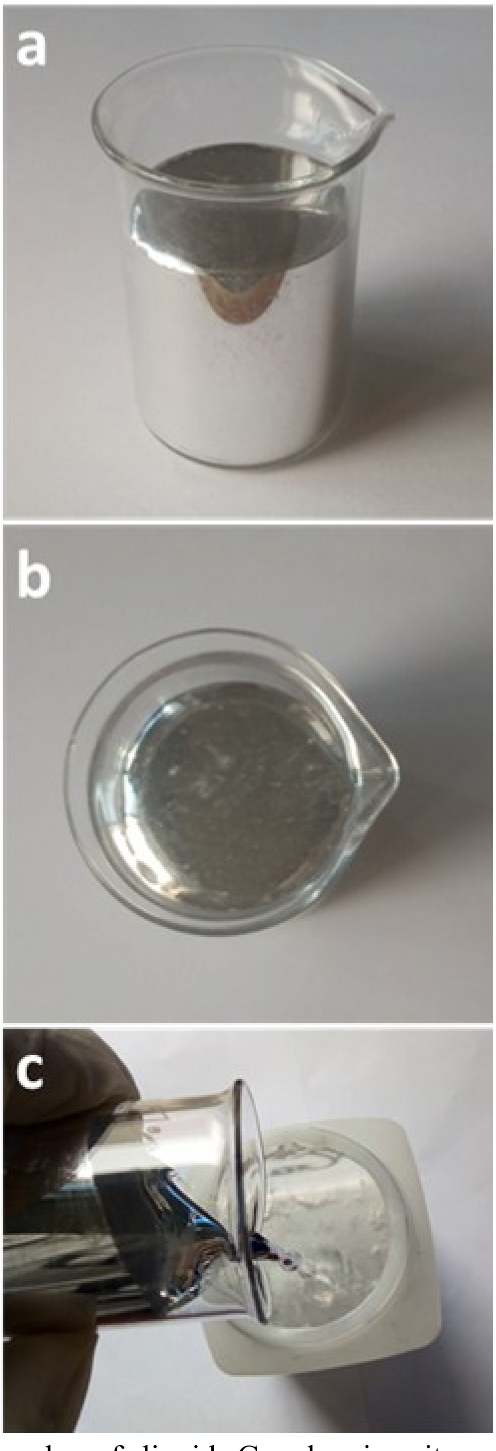

Figure S1. The photographs of liquid Ga showing its good fluidity at room temperature (above 30 ^{o}C).

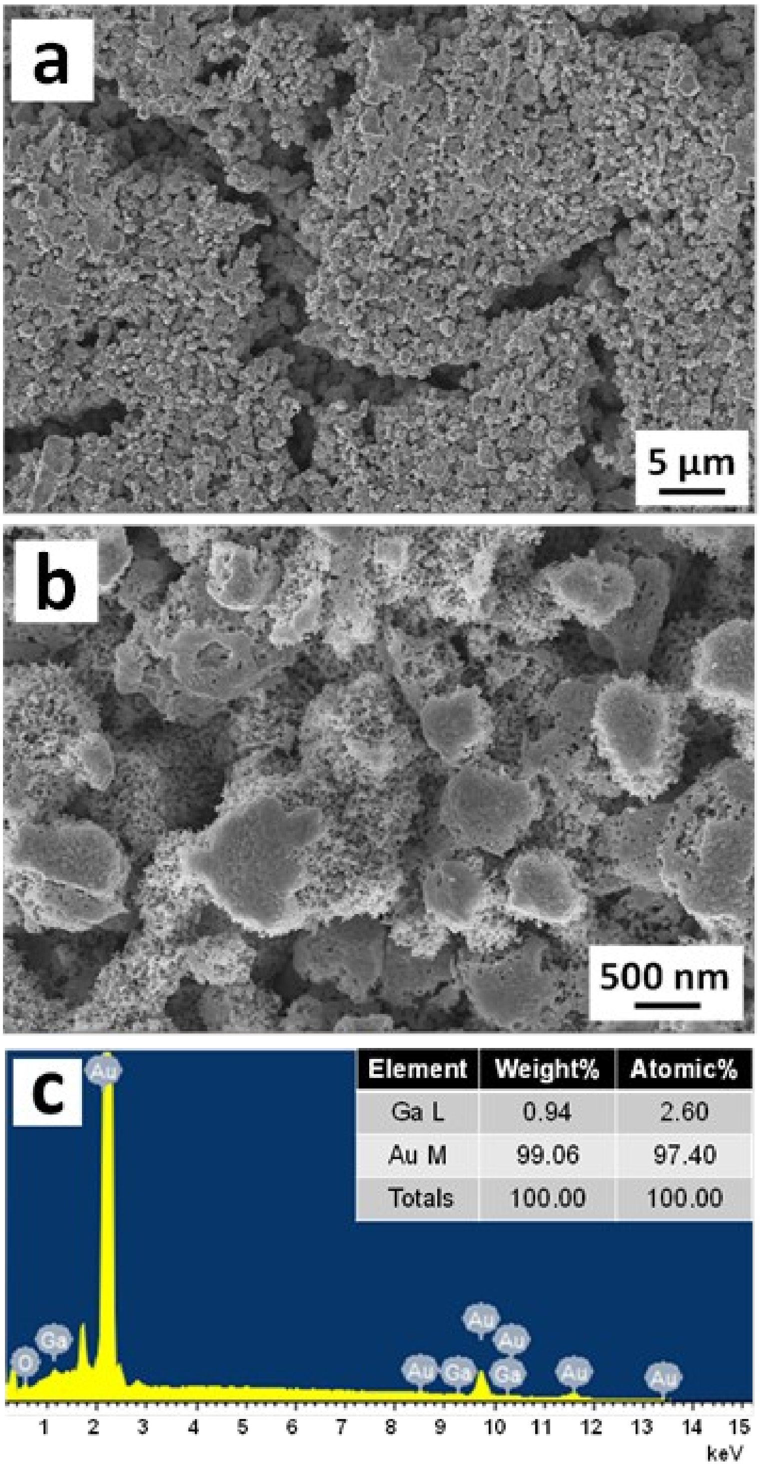

Figure S2. (a,b) SEM images of the nanoporous Au film supported on the Au foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset.

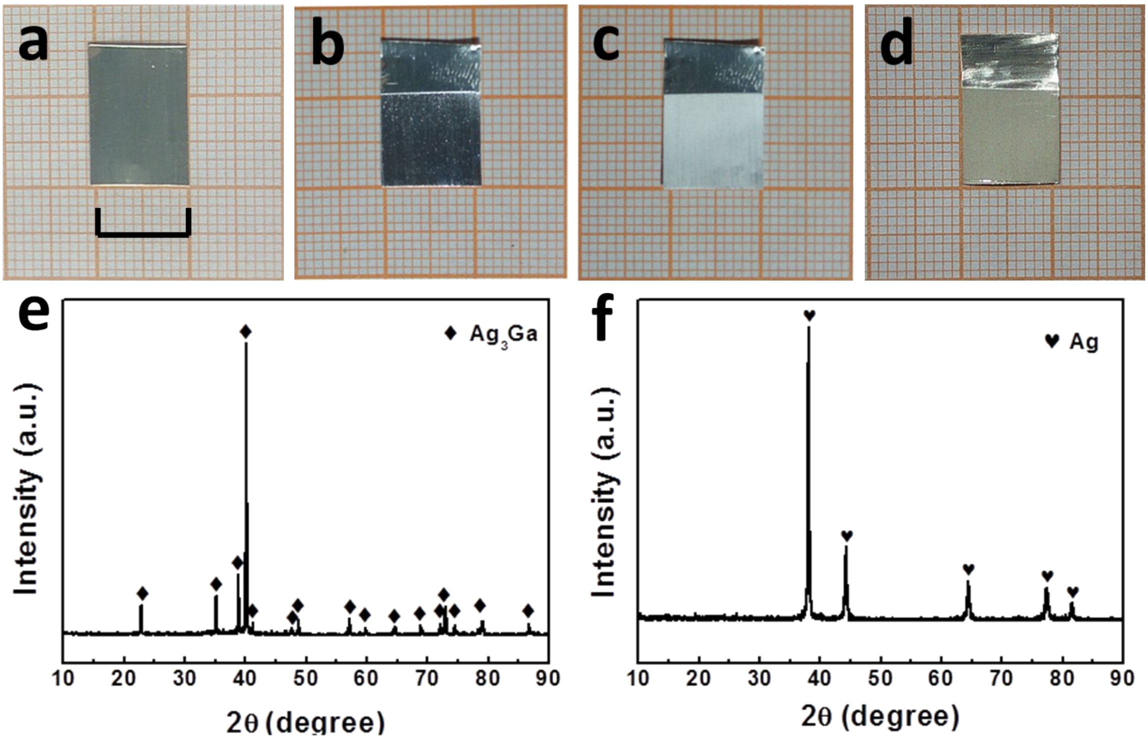

Figure S3. Photographs of (a) the pristine Ag foil, (b) the Ag foil covered with liquid Ga, (c) the annealed Ag foil covered with the Ag_3Ga phase (PDF # 47-0991), and (d) the as-dealloyed np-Ag film supported on the Ag foil. (e) The XRD pattern of the annealed Ag foil. (f) The XRD pattern of the as-dealloyed Ag foil.

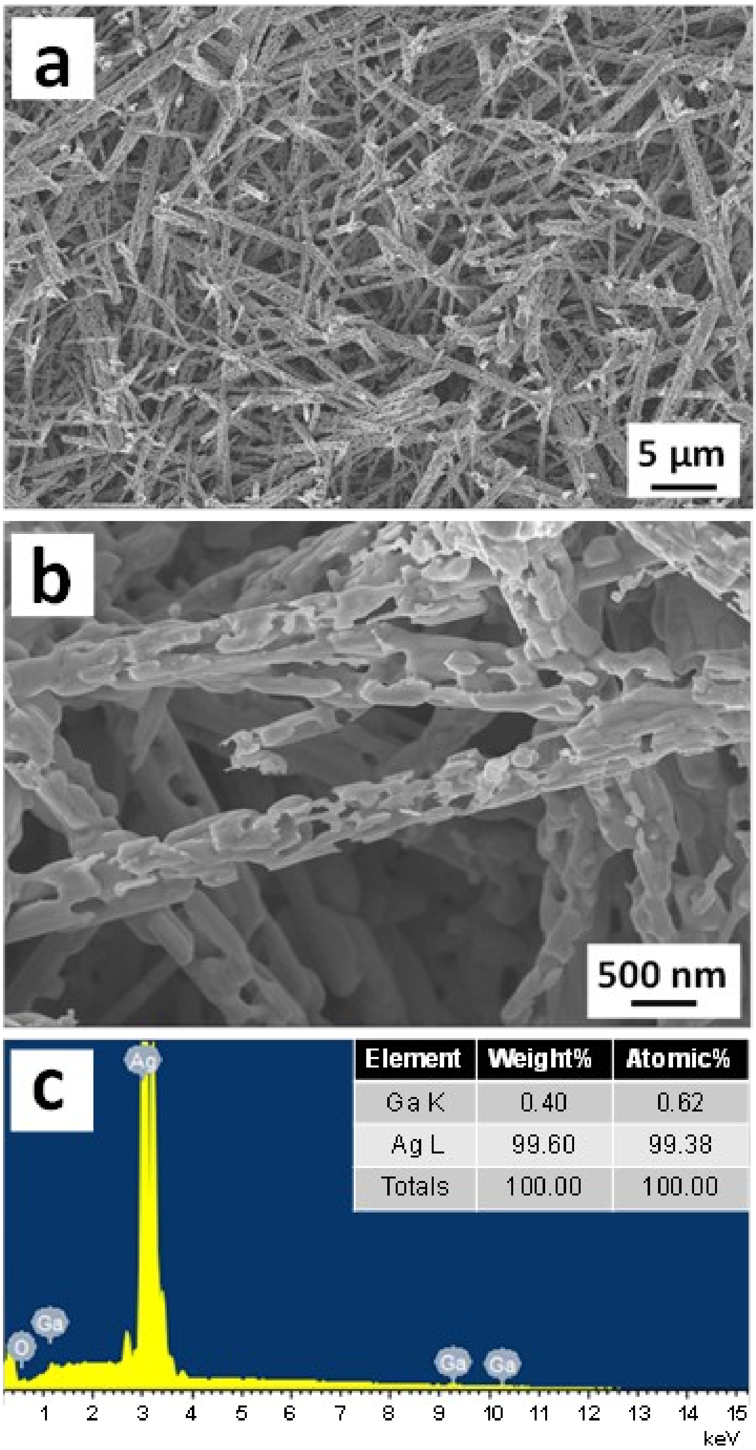

Figure S4. (a,b) SEM images of the nanoporous Ag film supported on the Ag foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset.

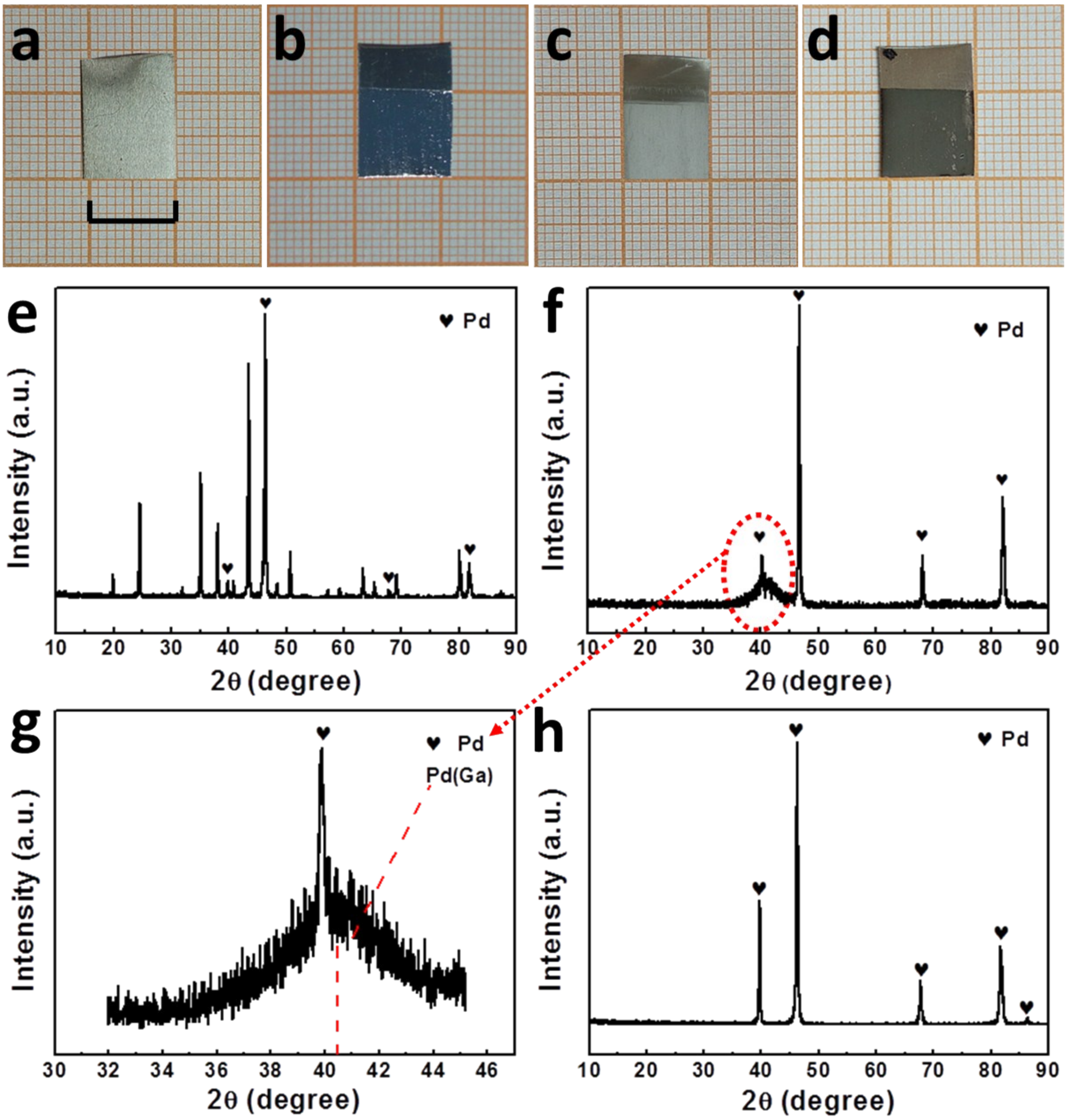

Figure S5. Photographs of (a) the pristine Pd foil, (b) the Pd foil covered with liquid Ga, (c) the annealed Pd foil covered with the Pd_xGa_y phase and (d) the as-dealloyed np-Pd film (area: 1 × 1 cm^2) supported on the Pd foil. (e) The XRD pattern of the annealed Pd foil. (f,g) The XRD pattern of the as-dealloyed Pd foil. (h) The XRD pattern of the pristine Pd foil.

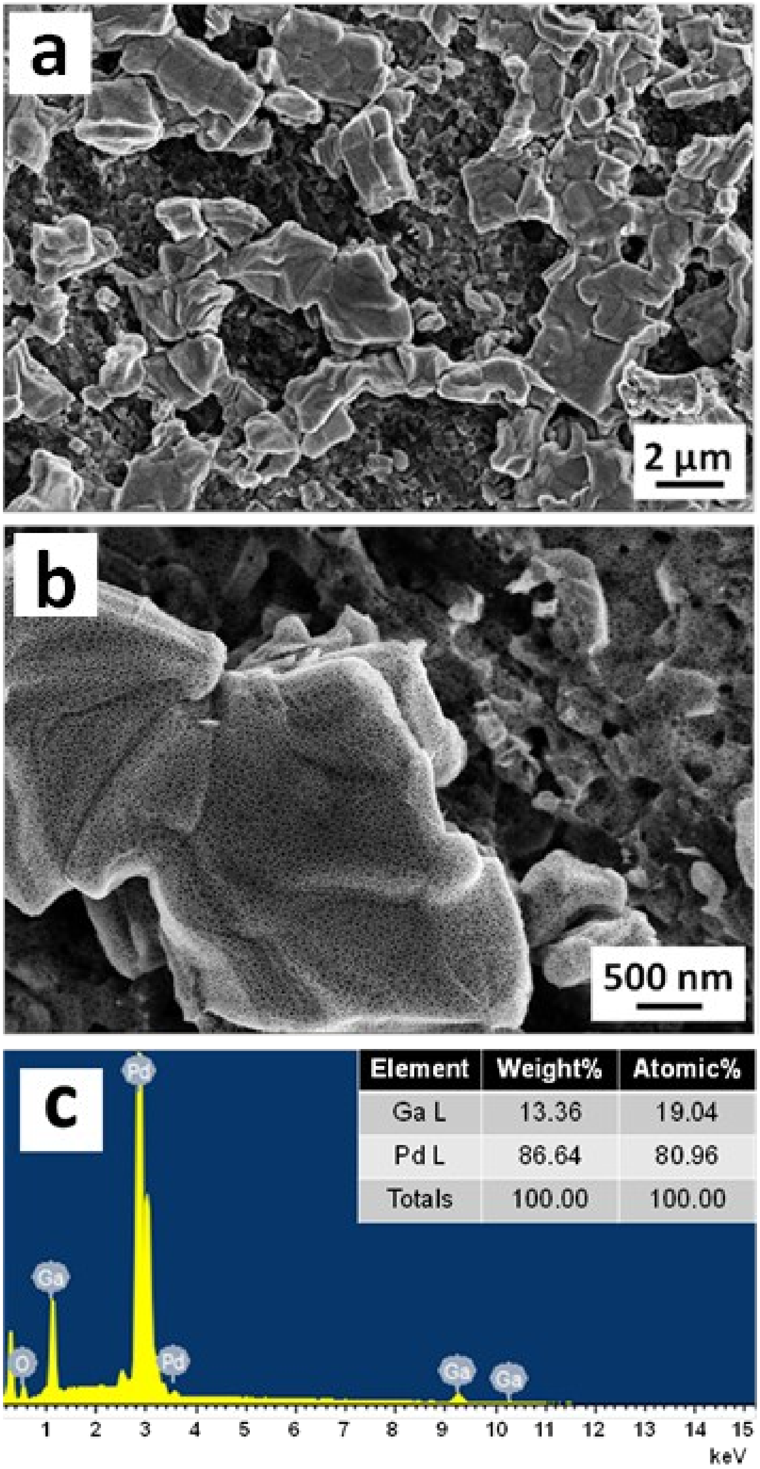

Figure S6. (a,b) SEM images of the nanoporous Pd film supported on the Pd foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset.

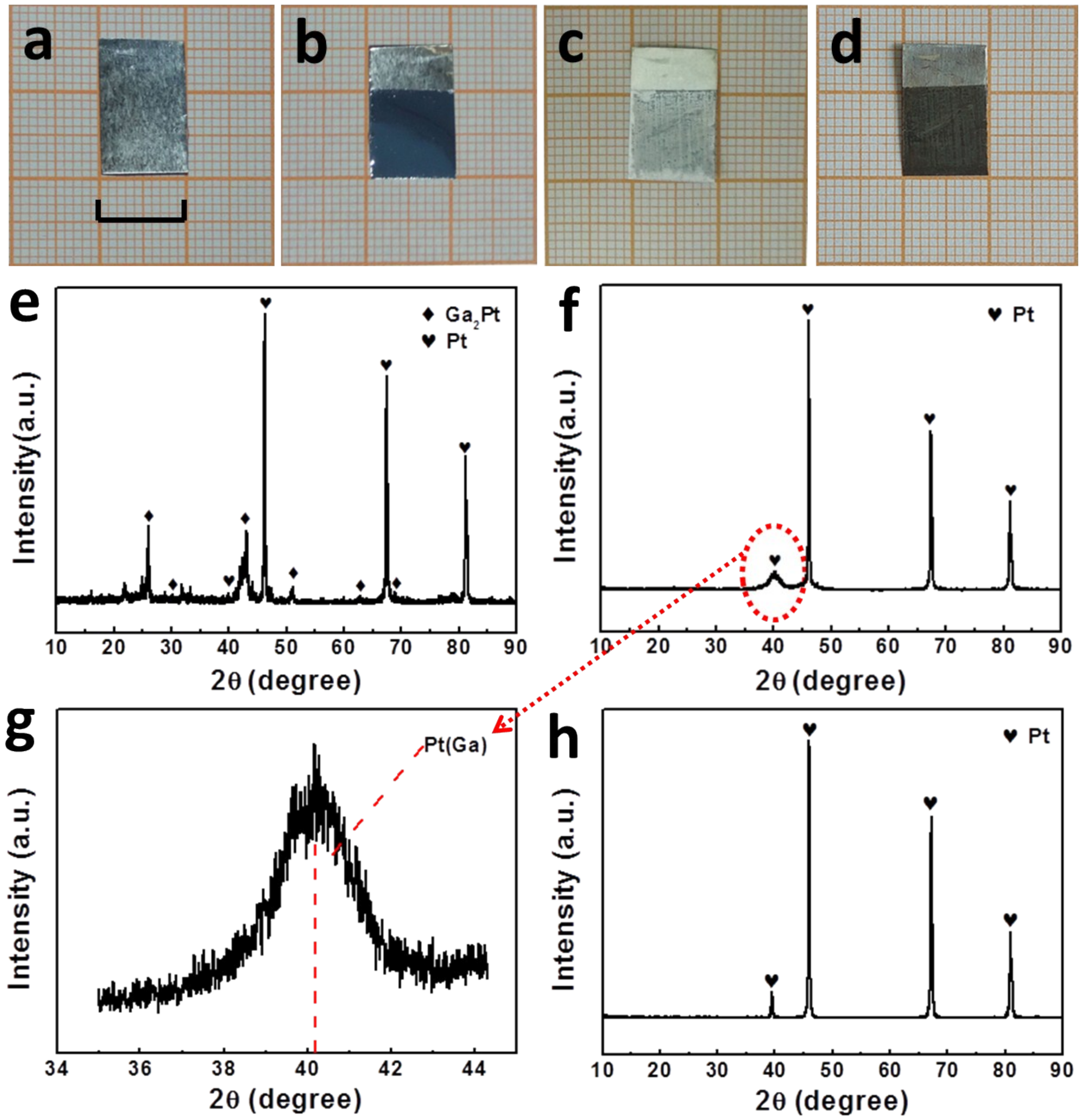

Figure S7. Photographs of (a) the pristine Pt foil, (b) the Pt foil covered with liquid Ga, (c) the annealed Pt foil covered with the Ga_2Pt phase (PDF # 03-1007), and (d) the as-dealloyed np-Pt film (area: 1 × 1 cm^2) supported on the Pt foil. (e) The XRD pattern of the annealed Pt foil. (f,g) The XRD pattern of the as-dealloyed Pt foil. (h) The XRD pattern of the pristine Pt foil.

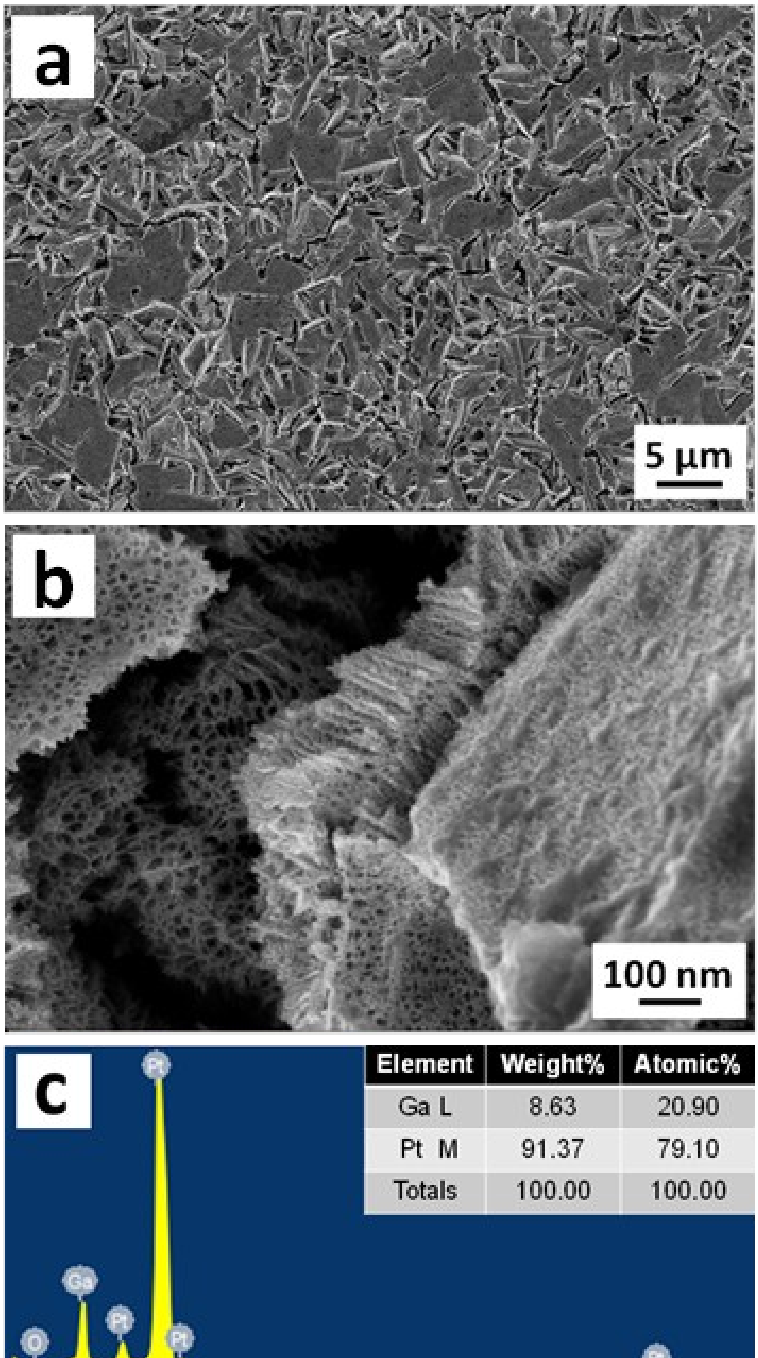

Figure S8. (a,b) SEM images of the nanoporous Pt film supported on the Pt foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset.

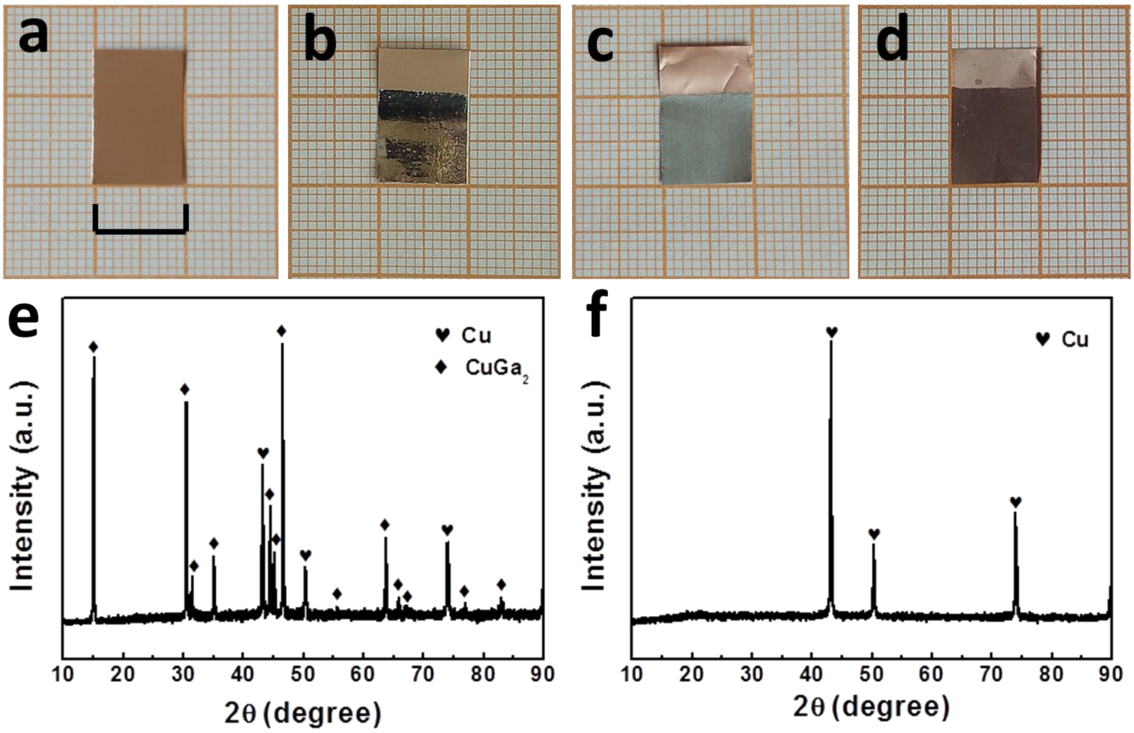

Figure S9. Photographs of (a) the pristine Cu foil, (b) the Cu foil covered with liquid Ga, (c) the annealed Cu foil covered with the $CuGa_2$ phase (PDF # 25-0275), and (d) the as-dealloyed np-Cu film (area: $1 \times 1\ cm^2$) supported on the Cu foil. (e) The XRD pattern of the annealed Cu foil. (f) The XRD pattern of the as-dealloyed Cu foil.

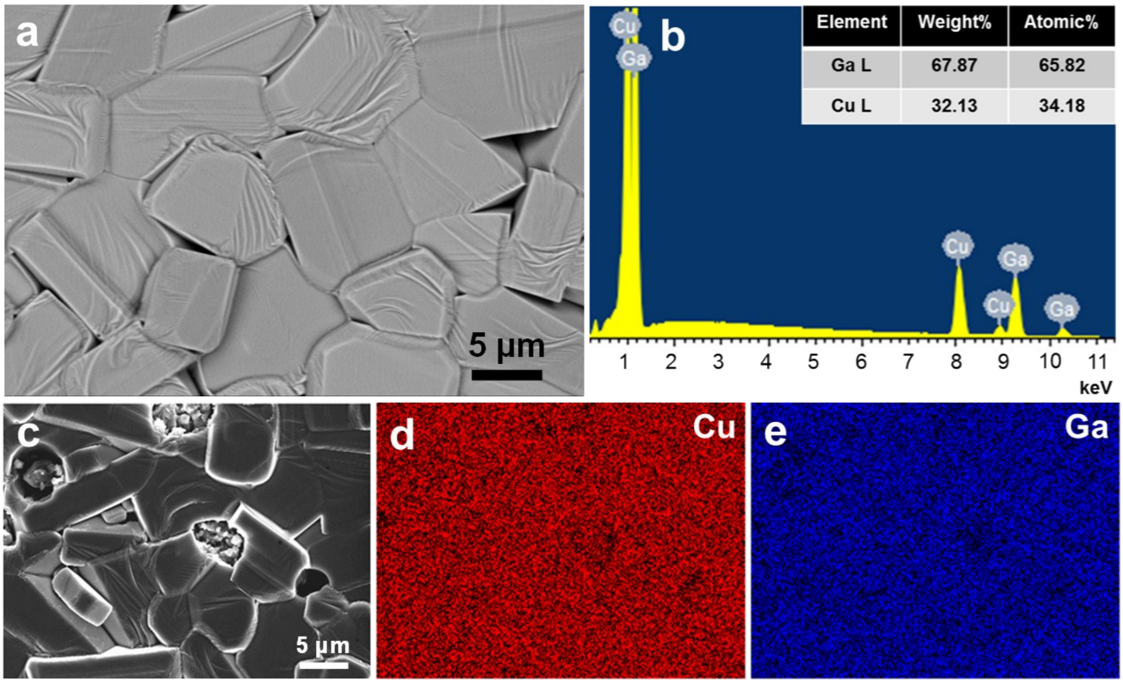

Figure S10. (a) The back-scattered SEM image of the as-annealed Cu foil covered with the $CuGa_2$ layer, which clearly shows the morphology and size of grains. (b) A typical EDX spectrum of the $CuGa_2$ layer, indicating that the atomic ratio of Cu:Ga is close to 1:2 (inset). (c) The secondary-electron SEM image of the $CuGa_2$ layer and corresponding elemental mapping spectra for (d) Cu and (e) Ga.

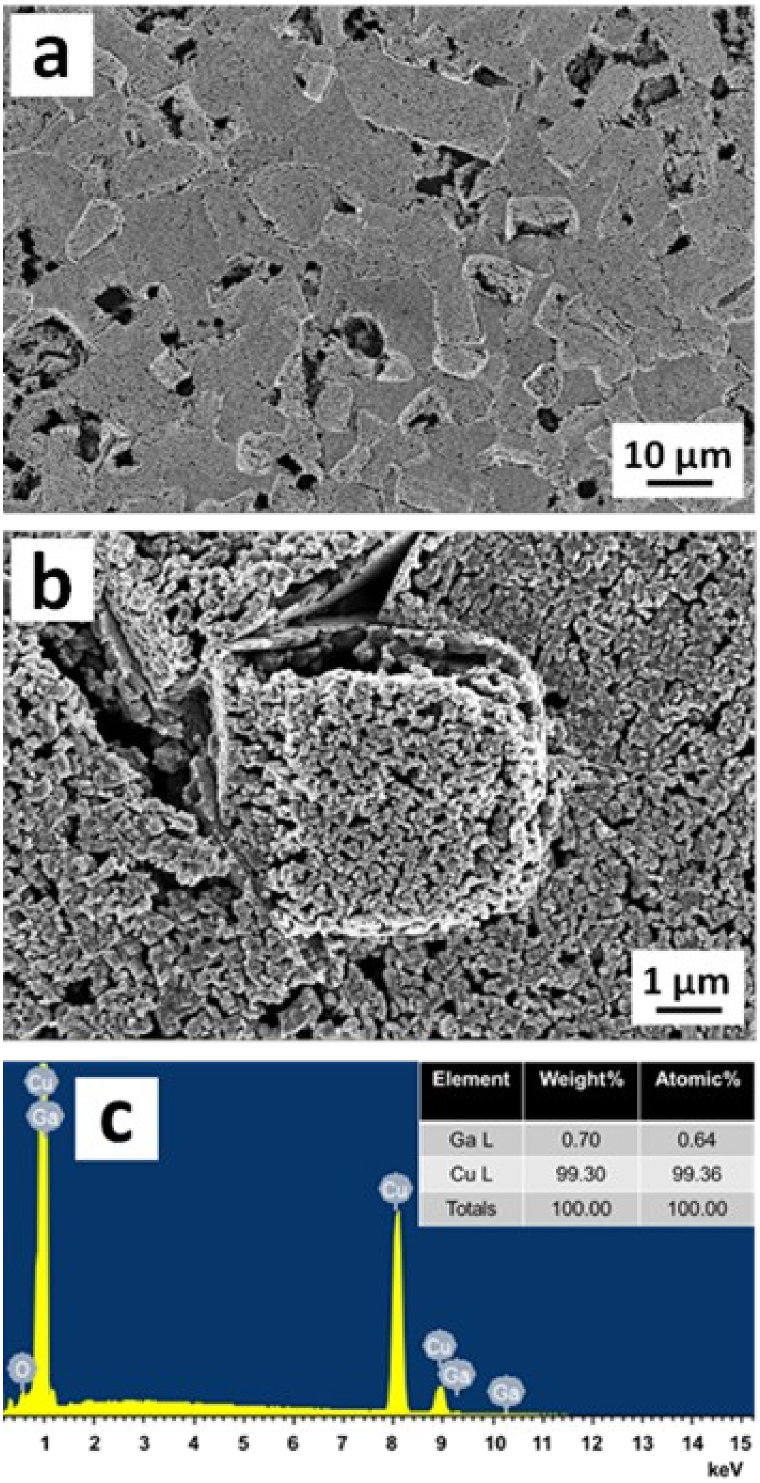

Figure S11. (a,b) SEM images of the nanoporous Cu film supported on the Cu foil. (c) A typical EDX spectrum. The grain-like characteristic can be clearly observed from the low-magnification SEM image in (a). The composition of the sample is presented in (c) as an inset.

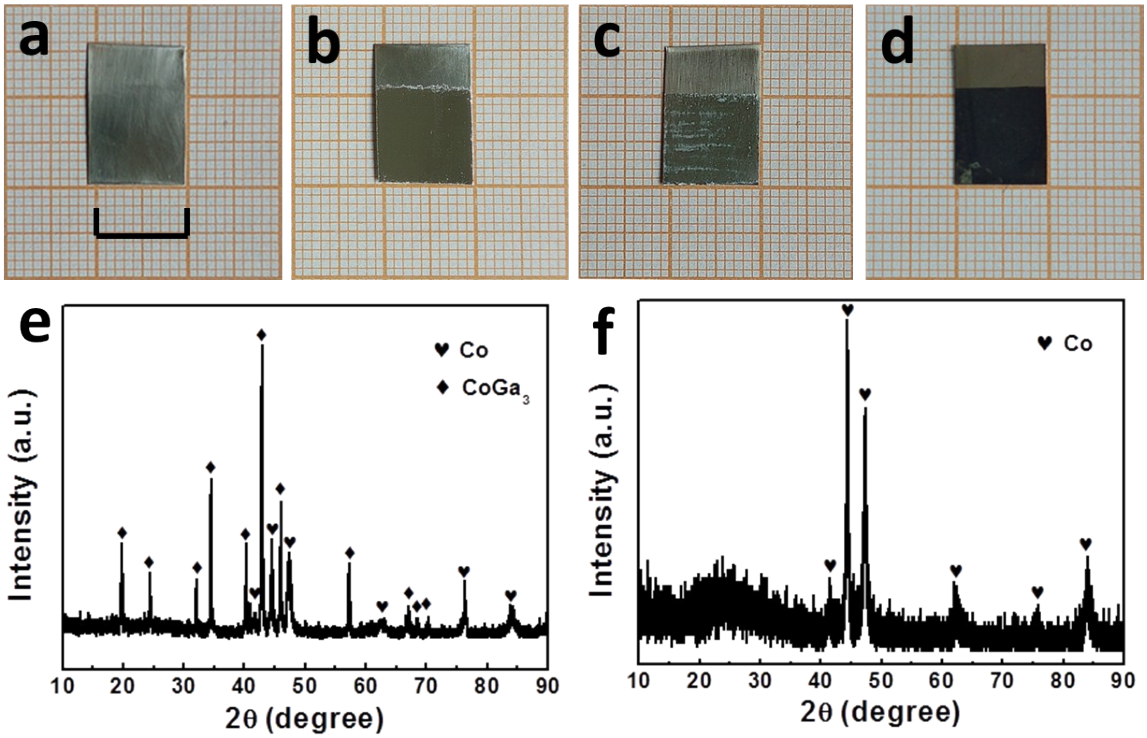

Figure S12. Photographs of (a) the pristine Co foil, (b) the Co foil covered with liquid Ga, (c) the annealed Co foil covered with the $CoGa_3$ phase (PDF # 15-0578), and (d) the as-dealloyed np-Co film (area: 1×1 cm^2) supported on the Co foil. (e) The XRD pattern of the annealed Co foil. (f) The XRD pattern of the as-dealloyed Co foil.

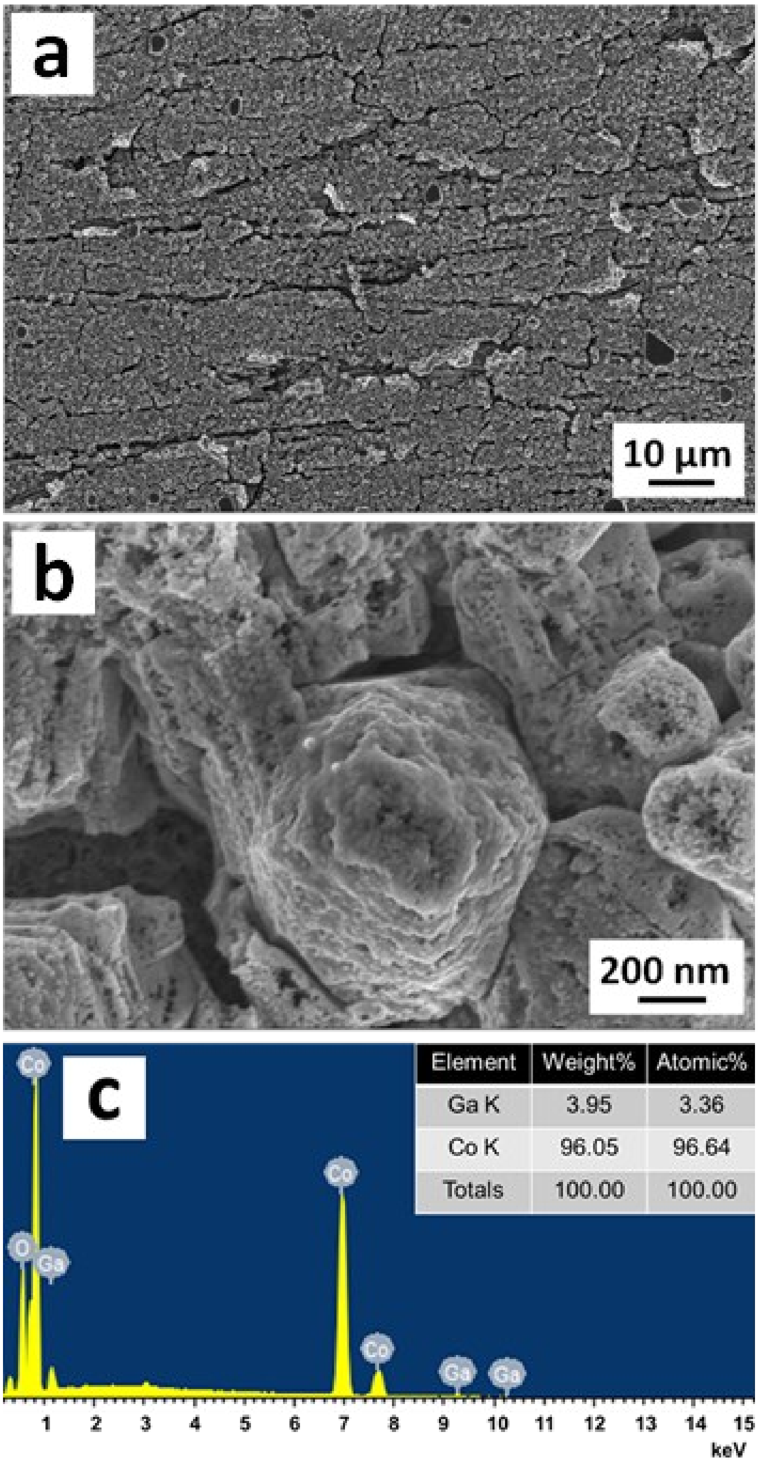

Figure S13. (a,b) SEM images of the nanoporous Co film supported on the Co foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset. A certain amount of oxygen in the as-dealloyed sample is attributed to slight surface oxidation of highly active nanoporous Co.

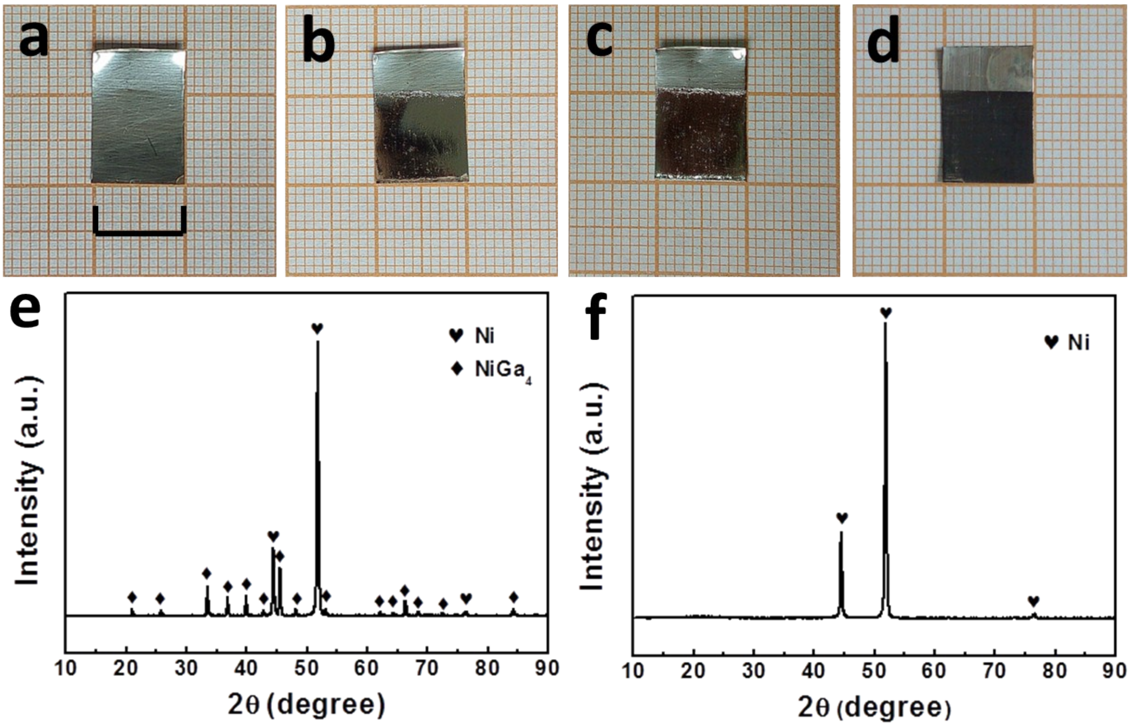

Figure S14. Photographs of (a) the pristine Ni foil, (b) the Ni foil covered with liquid Ga, (c) the annealed Ni foil covered with the $NiGa_4$ phase (PDF # 37-1095), and (d) the as-dealloyed nanostructured Ni film (area: 1 × 1 cm^2) supported on the Ni foil. (e) The XRD pattern of the annealed Ni foil. (f) The XRD pattern of the as-dealloyed Ni foil.

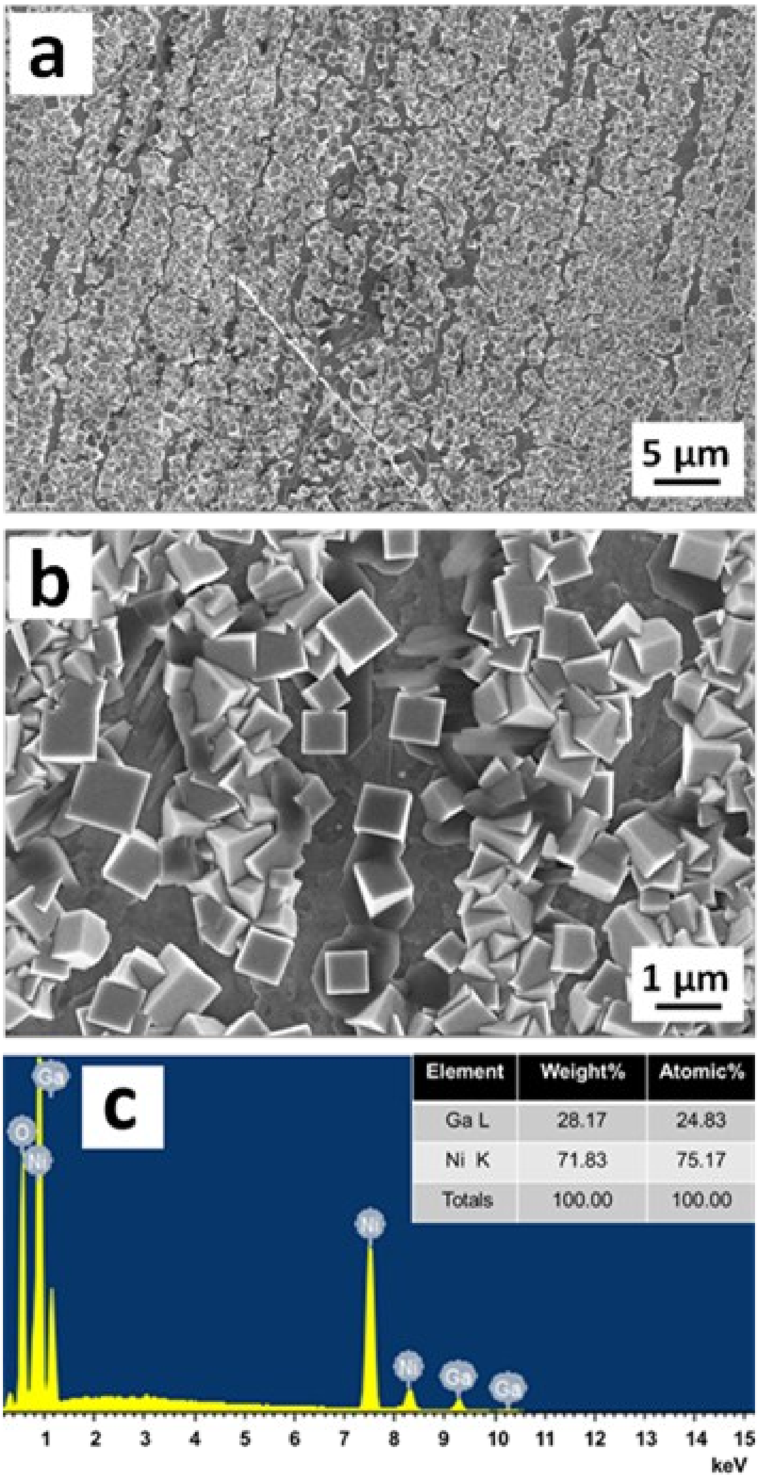

Figure S15. (a,b) SEM images of the nanostructured Ni film supported on the Ni foil. (c) A typical EDX spectrum. The composition of the sample is presented in (c) as an inset. A certain amount of oxygen in the as-dealloyed sample is attributed to slight surface oxidation of highly active nanostructured Ni.

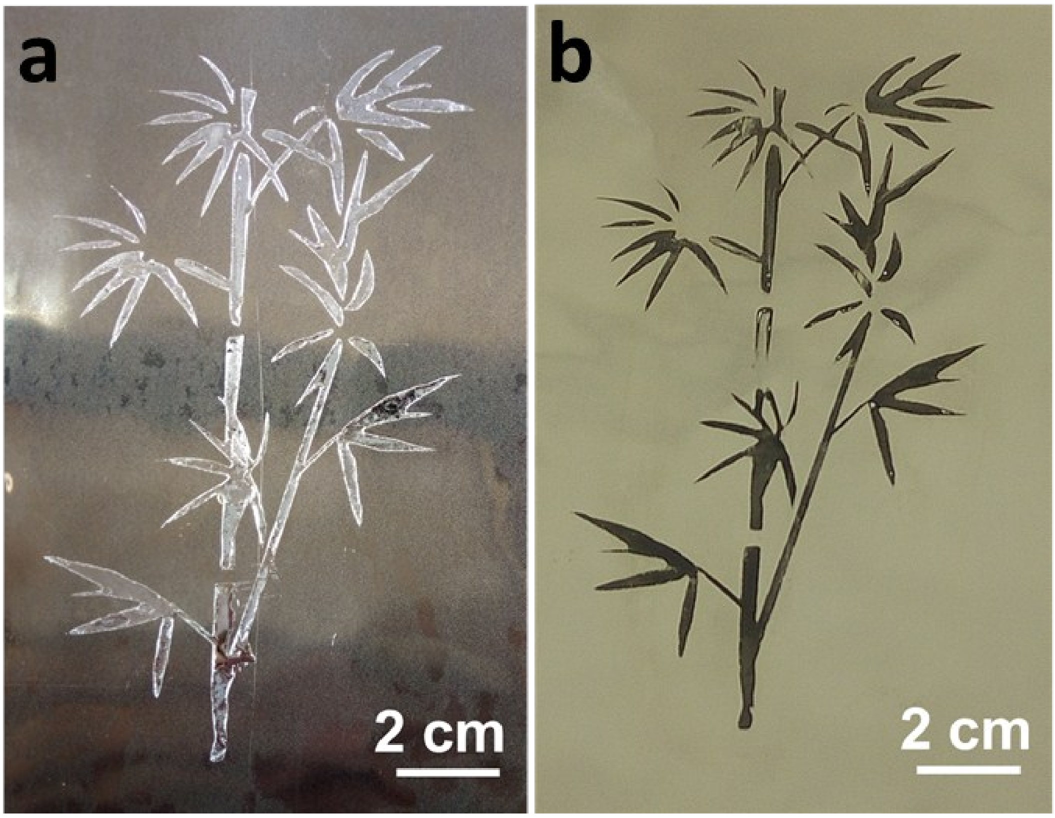

Figure S16. Photographs of the (a) as-annealed and (b) as-dealloyed Ni foil with a bamboo pattern.

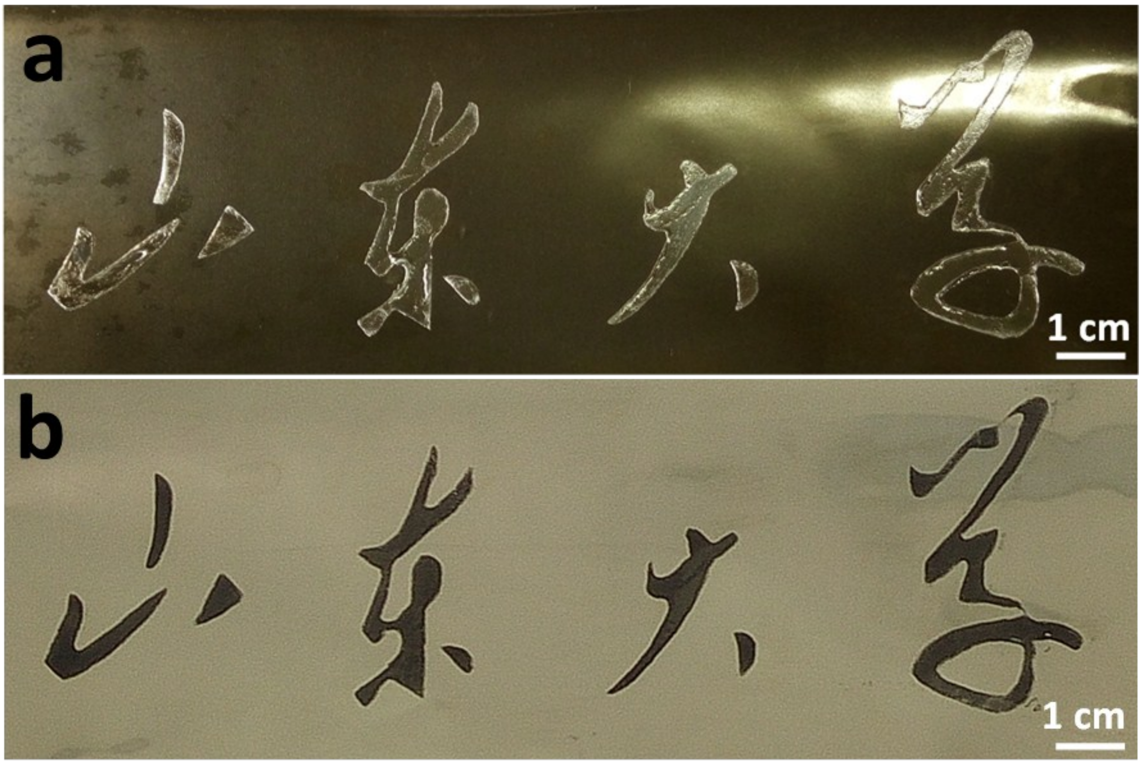

Figure S17. Photographs of the (a) as-annealed and (b) as-dealloyed Ni foil with a pattern of Chinese characters ‘Shandong University’.

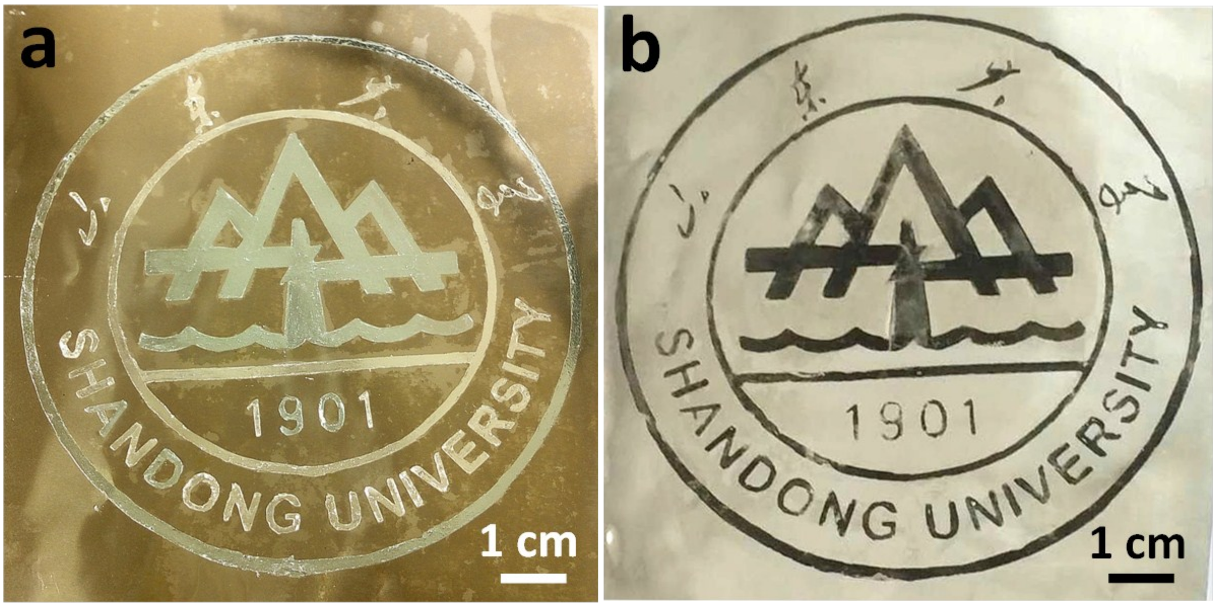

Figure S18. Photographs the (a) as-annealed and (b) as-dealloyed Ni foil with a pattern of school logo for ‘Shandong University’.

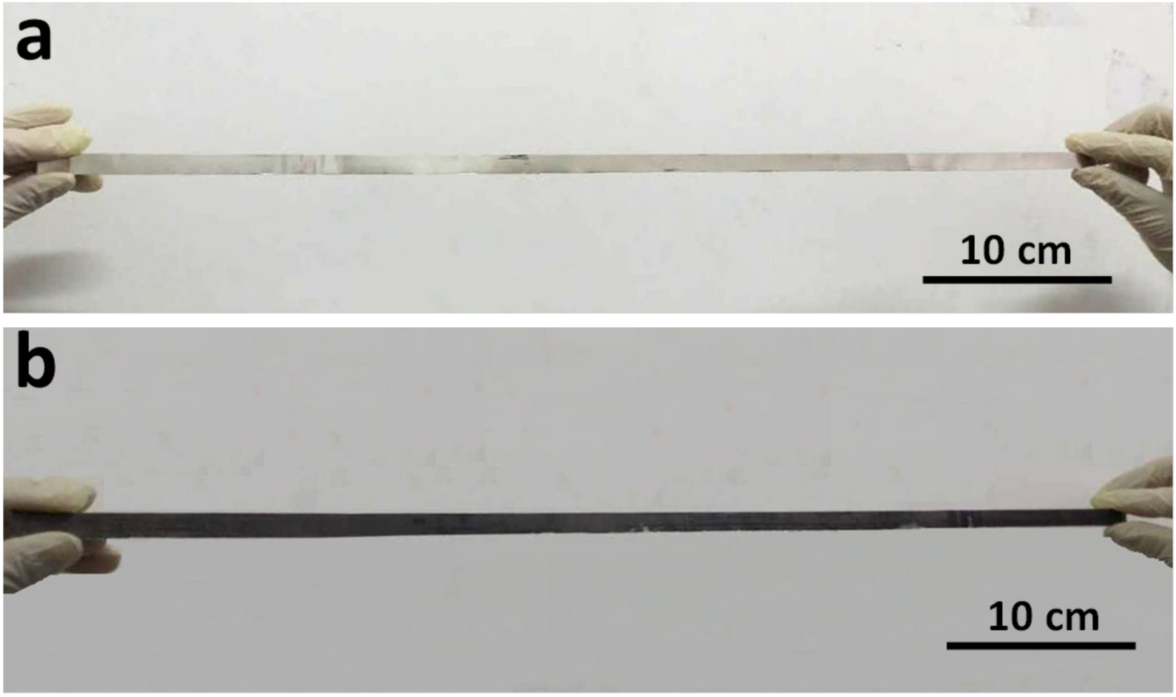

Figure S19. Photographs of the (a) pristine and (b) as-dealloyed Ni foil with a size of 2 cm (width) × 50 cm (length).

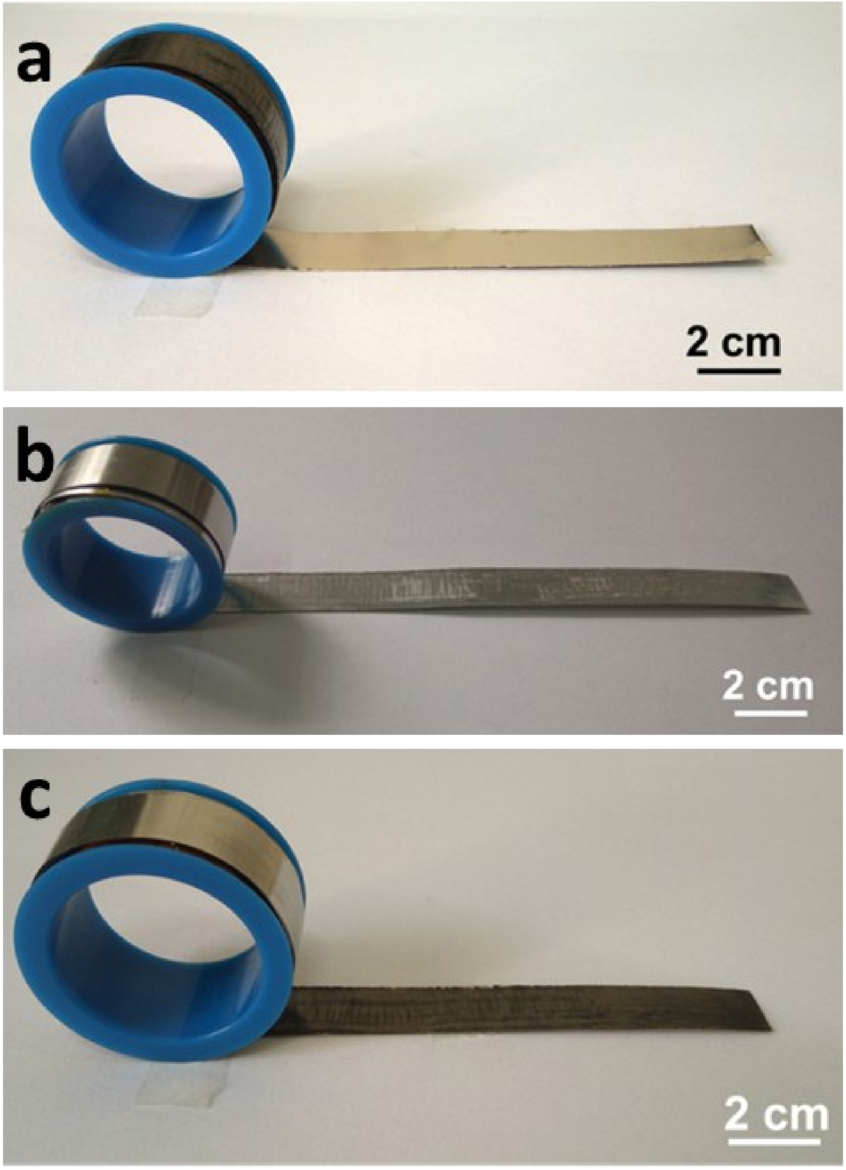

Figure S20. Photographs of the rolled-up Ni foil with a size of 2 cm (width) × 50 cm (length): (a) pristine, (b) as-annealed and (c) as-dealloyed.

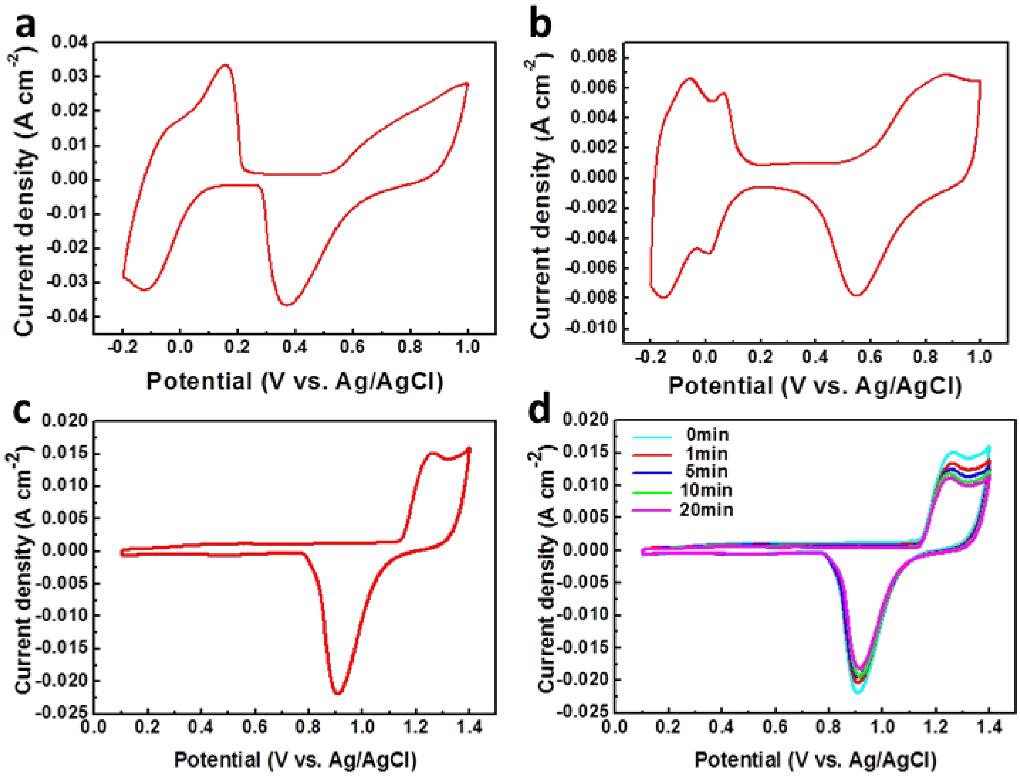

Figure S21. CV curves of (a) the Pd foil-supported np-Pd film, (b) the Pt foil-supported np-Pt film and (c) the Au foil-supported np-Au film in the N_2-purged 0.5 M H_2SO_4 solution. (d) CVs of the Au foil-supported np-Au film in the N_2-purged 0.5 M H_2SO_4 solution after different durations of ultrasonic treatment in ultrapure water. (Scan rate: 50 mV s^{-1})

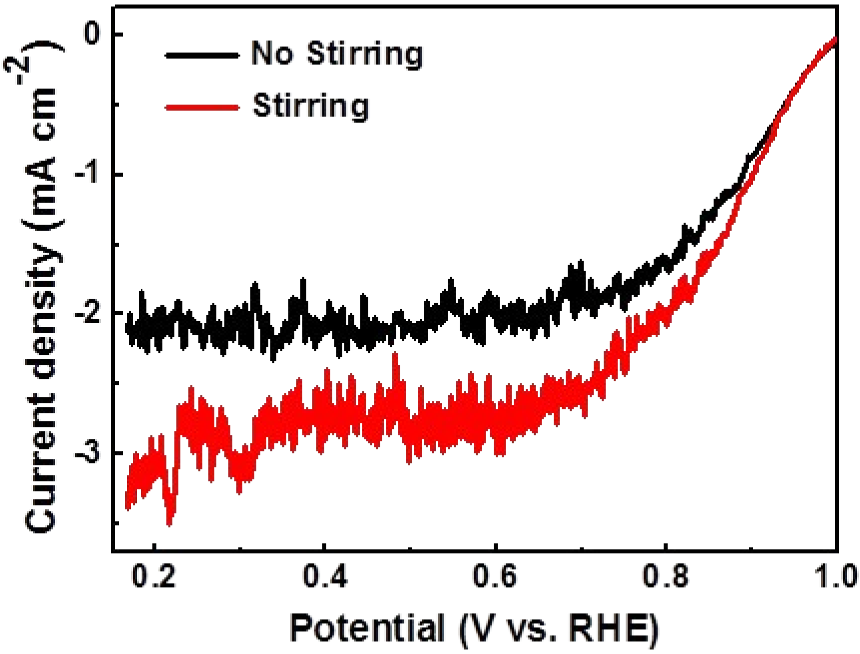

Figure S22. Polarization curves of the np-Ag foil towards the ORR in the O_2-saturated 0.1 M KOH solution without and with stirring at the scan rate of 10 mV s^{-1}.