Electronic Supplementary Material (ESI) for Nanoscale

Pulse-Reverse Electrodeposition for Mesoporous Metal Films: Combination of Hydrogen Evolution Assisted Deposition and Electrochemical Dealloying

Serhiy Cherevko,*[a] Nadiia Kulyk,[a] and Chan-Hwa Chung*[a]

Advanced Materials and Process Research Center for IT, School of Chemical Engineering, Sungkyunkwan University, Suwon 440-746, Republic of Korea.

Fax: (+82) 31-290-7272; Tel: (+82) 31-290-7260;
E-mail: s.cherevko@gmail.com; chchung@skku.edu

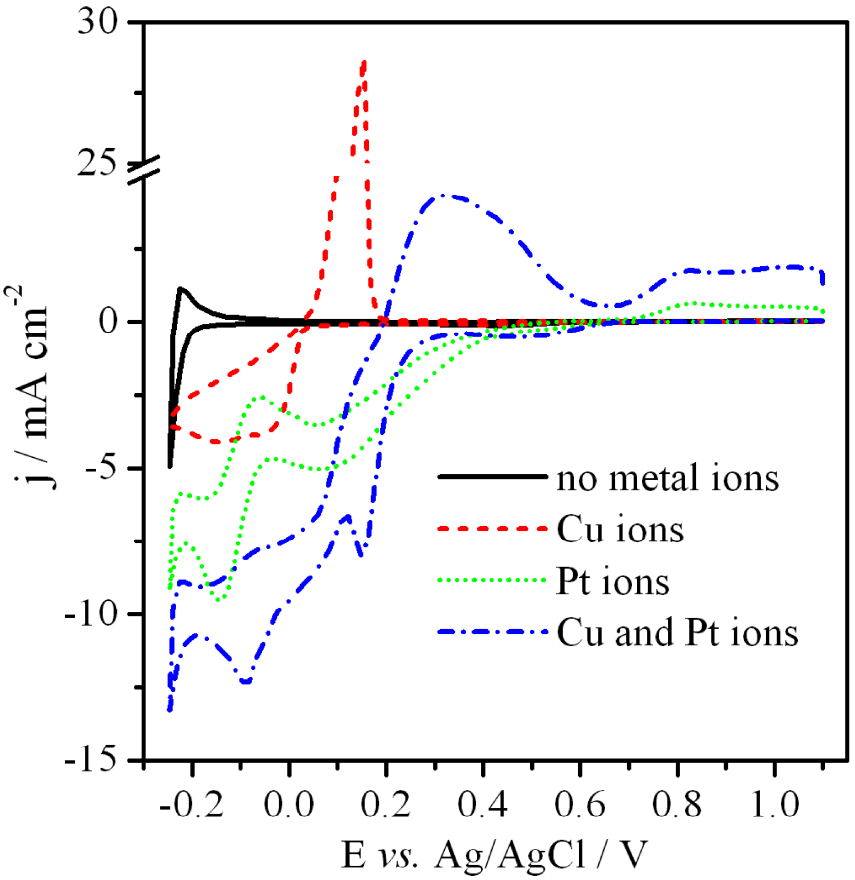

Fig. S1. CVs taken on a Pt/Ti/Si electrode in solutions containing no metal ions, Cu ions only, Pt ions only, and Cu and Pt ions. The scan rate was 20 mV s-1.

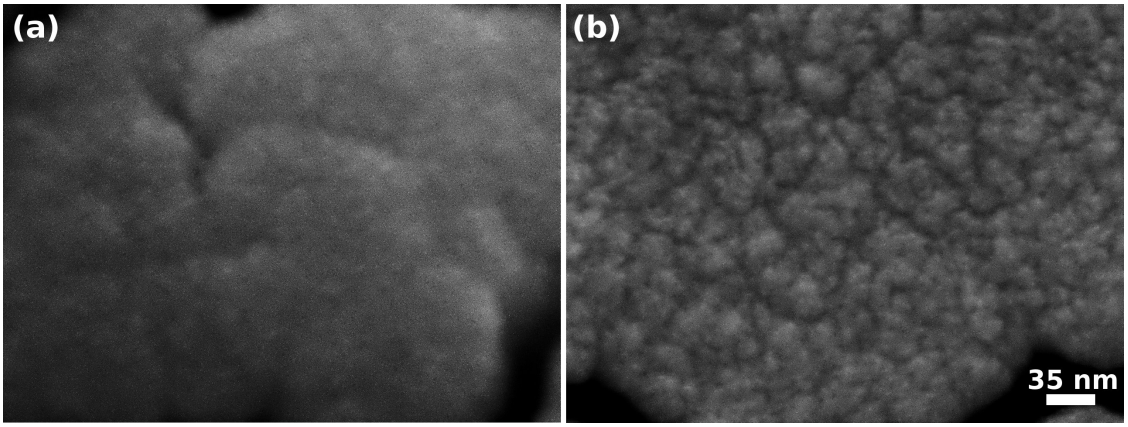

Fig. S2. SEM images taken from samples prepared in (a) PRPM (500 cycles, t_c = 0.1 s, t_a = 0.3 s) and (b) CPM.

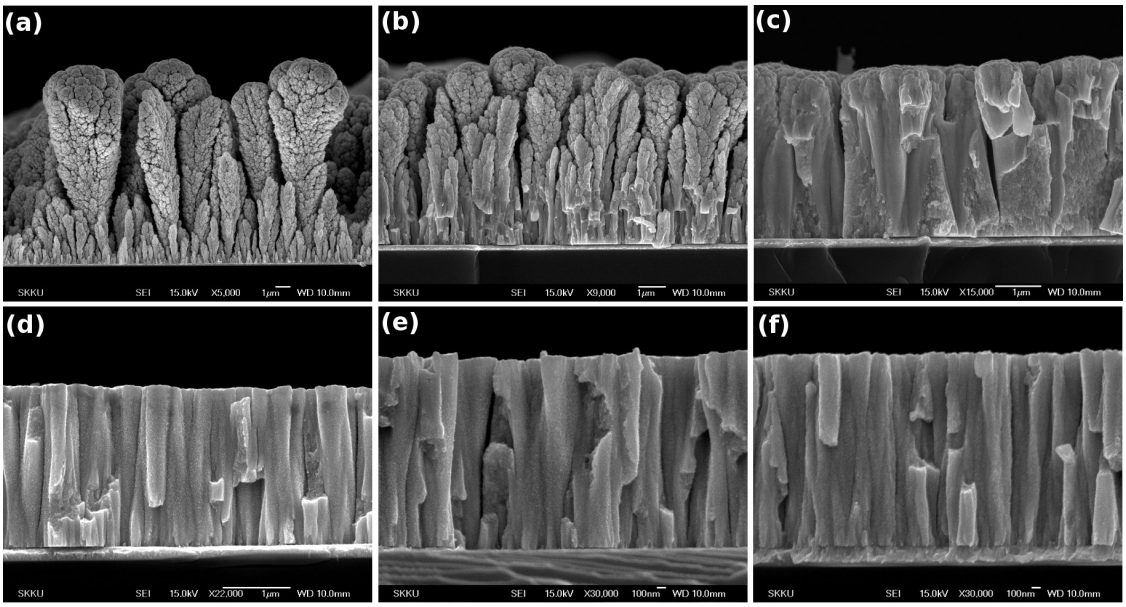

Fig. S3. SEM images showing cross-section views of films prepared when anodic pulse duration was (a) 0, (b) 0.05, (c) 0.1, (d) 0.5, (e) 1, (f) 2 seconds.

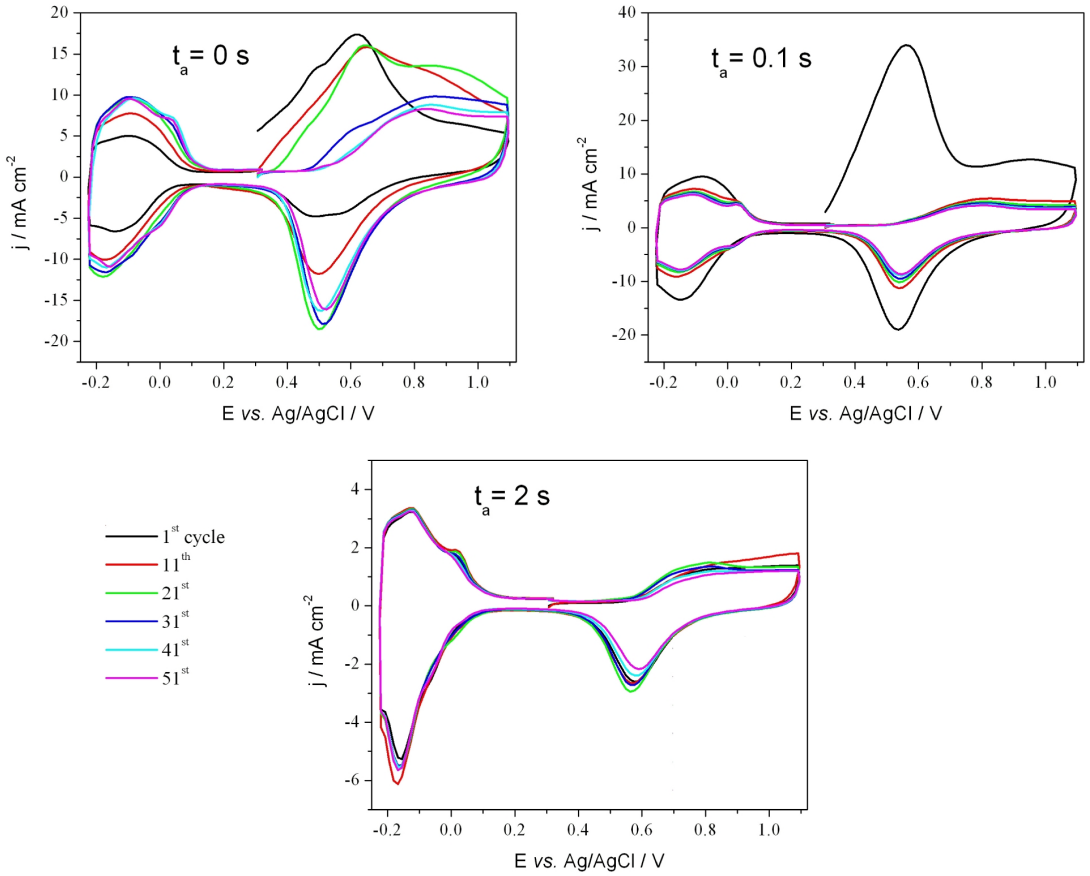

Fig. S4. Cyclic voltammograms showing the surface evaluation during the cycling (number are indicated). CVs were taken from the electrodes prepared with different anodic pulses. Scan rate was 10 mV s^{-1}.

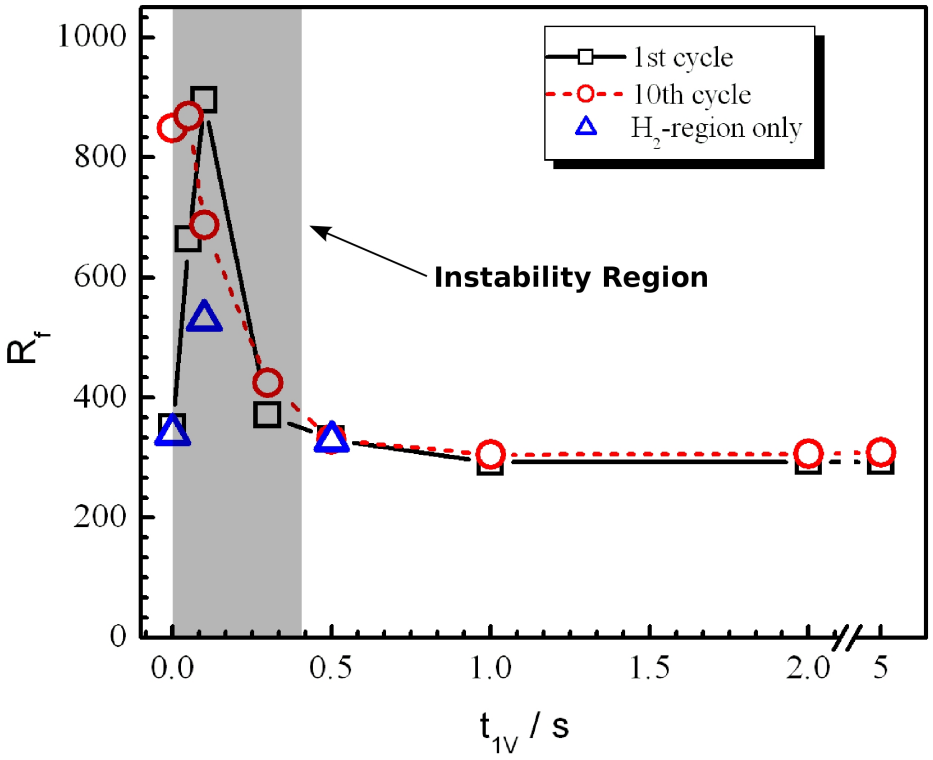

Fig. S5. Variation of film roughness factor on anodic pulse durations (E_a = 1V). R_f was measured by cycling in broad potential window and H_2 region only. Former one is presented by the data obtained from 1st and 10th cycles.

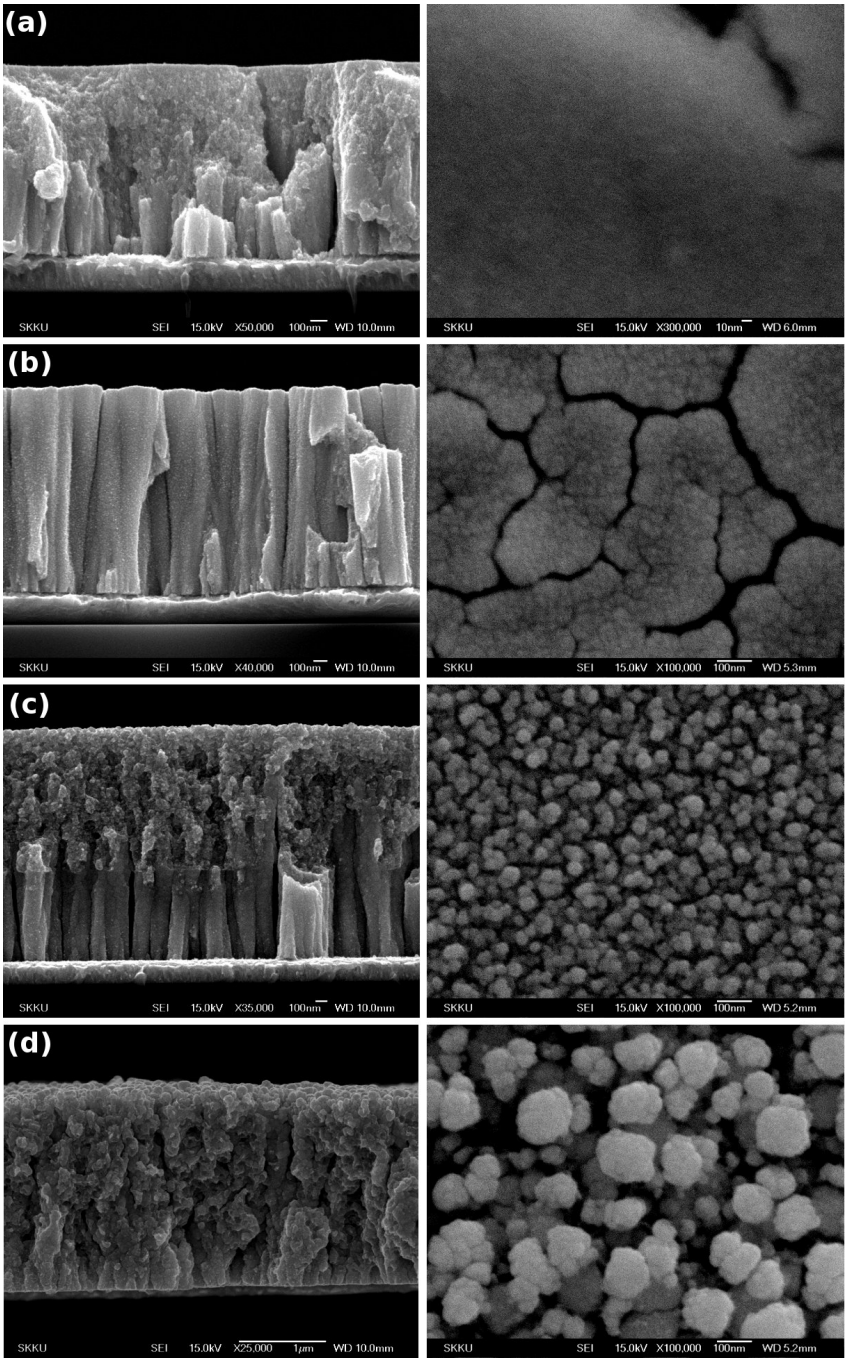

Fig. S6. SEM images showing cross-section (left panel) and top (righ panel) views of films prepared when cathodic pulse duration was (a) 0.03, (b) 0.1, (c) 0.3, (d) 1 seconds.

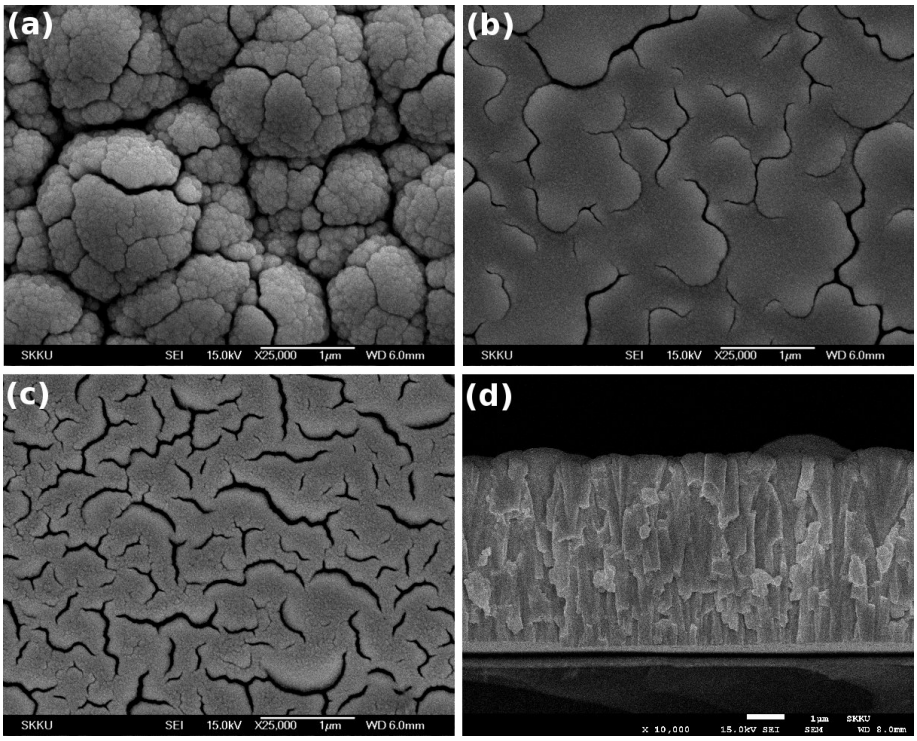

Fig. S7. SEM images of films formed when anodic potential was (a) 0.2, (b) 0.4, (c) 0.6, V. (d) Shows cross-section view of film presented in (a).