Supporting Information

Electrophoretic Deposition of Aged and Charge Controlled Colloidal Copper Sulfide Nanoparticles

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Figure S1. SEM images of the films deposited on the positively charged substrates using Cu$_{2-x}$S NPs that were subjected to various aging times NPs.
Figure S2. SEM images of the films deposited on negatively charged substrates using Cu$_{2-x}$S NPs that were subjected to various aging times
Figure S3. Cross-sectional SEM images of the films deposited on positively charged substrates using Cu$_{2-x}$S NPs that were subjected to various aging times.
Figure S4. (a) O 1s XPS spectra of non-aged and aged NPs. The peak deconvolution of the O (1 s) XPS core level of (b) non-aged and (c) aged NPs.
**Figure S5.** The XRD pattern of the 720-h aged NPs. The orange bars below the XRD pattern correspond to the reference of roxbyite phase (JCPDS #23-0958).
Figure S6. FT-IR spectra of non-aged (green curve) and aged NPs (orange curve).
Table S1. Elemental composition (at. %) based on the XPS analysis of the non-aged and aged Cu$_{2-x}$S NPs.

| Atomic % | Non-aged NP | Aged NP |
|----------|-------------|---------|
| C 1s     | 46.72       | 47.03   |
| Cu 2p3   | 29.92       | 27.08   |
| S 2p     | 16.95       | 15.9    |
| N 1s     | 2.14        | 2.12    |
| O 1s     | 4.27        | 7.87    |