Supplementary Information for

Understanding Effects of NaCl, NaBr and Their Mixtures on Silver Nanowire Nucleation and Growth in Terms of the Distribution of Electron Traps in Silver Halide Crystals

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Figure S1. Digital photographs of reaction flasks with densely opalescent (a), slightly gray (b) and silver gray swirls (c), and the corresponding distribution statistics of diameter (a1, b1, c1) and length (a2, b2, c2) for the 30 min growth AgNWs with the additives of NaCl, NaBr and NaCl/NaBr, respectively.
**Figure S2.** EDX analysis of the products at C and D points for the sample obtained with NaCl/NaBr co-additive shown in Figure 4h in the text.
Figure S3. XRD patterns of samples obtained with NaCl/NaBr additive for 0 min growth and the AgCl/AgBr mixture (a). The later was got by simply mixing these two types of AgNWs samples prepared with individual NaCl and NaBr additive. Triangles present the diffraction peaks from AgBr$_{1-x}$Cl$_x$ crystal, which was quite different with that from AgCl or AgBr crystal. (b) and (c) present the XRD patterns for the evolution of AgNWs samples with NaCl/NaBr concentration of 1.2/1.2 mM and 1.2/2.4 mM, respectively.
**Figure S4.** SEM images of AgNWs obtained with NaCl additive for the increasing concentration of 0.12 (a, b, c), 1.2 (d, e, f), 6.0 (g, h, i) at the growth time of 10 (left), 30 (middle) and 60 min (right column). AgNPs (and MTPs) formed on the surface of AgCl crystal were indicated by arrows in (d). The scale bar is 500 nm. The inset in (h) shows one AgNW emanating from the AgBr surface with the scale bar of 100 nm.
Figure S5. SEM images of AgNWs obtained with NaBr additive for the increasing concentration of 0.12 (a, b, c), 1.2 (d, e, f), 6.0 mM (g, h, i) at the growth time of 10 (left), 30 (middle) and 60 min (right column). AgNPs (and MTPs) formed on the surface of AgBr crystal were indicated by arrows in (a, d, h). The scale bar is 500 nm. The inset in (i) shows one AgNW growing from the AgBr surface with the scale bar of 100 nm.
Figure S6. EDX analysis of the products at A and B points for the sample obtained with NaBr additive shown in Figure 4e in the text.
**Figure S7.** SEM images of sample obtained with NaCl/NaBr additive for a Cl/Br molar ratio of 1.
Figure S8. UV-vis absorbance spectra (a) and XRD patterns (b) for 30 min growth samples with NaCl/NaBr additive of different concentrations. The arrows in (b) indicate the AgBr$_{1-x}$Cl$_x$ crystal remaining in the products.
Figure S9. Distribution statistics of diameter (a, b) and length (a1, b1) for the 30 min growth AgNWs with NaCl/NaBr concentrations of 0.12/0.06mM and 6.0/3.0 mM, respectively.
Figure S10. Digital photographs of glass substrate labeled with the number of “0” and the three AgNWs films on glass substrates with transmittance of 98, 95 and 86% labeled with the number of “1”, “2” and “3”, respectively.
Figure S11. Optical microscope images of the three AgNWs films on glass substrates as described in Figure S10. The scale bar is 50µm.
Table S1. Detailed conditions of AgNW synthesis and the diameters for 30 min growth samples.

| Sample No. | NaCl (mM) | NaBr (mM) | Diameter (nm) |
|------------|-----------|-----------|---------------|
| A₁         | 0.12      | 0         | 160           |
| A₂         | 1.2       | 0         | 162           |
| A₃         | 6.0       | 0         | 135           |
| B₁         | 0         | 0.12      | 30            |
| B₂         | 0         | 1.2       | 27            |
| B₃         | 0         | 6.0       | ---           |
| C₁         | 0.12      | 0.06      | 94            |
| C₂         | 1.2       | 0.6       | 40            |
| C₃         | 6.0       | 3.0       | 29            |
Table S2. Ultra-thin AgNWs obtained by other researchers using NaCl/NaBr co-additive with Cl/Br molar ratio of 2 except the last two cases.

| Synthesis atmosphere | Molar ratio of AgNO₃/NaCl/NaBr | Diameter (nm) | Aspect ratio | AgNW yield (%) | References |
|----------------------|---------------------------------|---------------|--------------|----------------|------------|
| N₂                   | 12/2/1                          | 20            | 2000         | 57.7           | Ref. 1     |
| N₂                   | 13/2/1                          | 20            | 1500         | 94.5           | Ref. 2     |
| N₂                   | 300/2/1                         | 44            | ----         | ----           |            |
| N₂ high pressure     | 12/2/1                          | 30            | ----         | ----           | Ref. 3     |
| N₂ high pressure     | 300/2/1                         | 36            | ----         | ----           |            |
| N₂                   | 12/2/1                          | 16~22         | 1000         | ----           |            |
| Air                  | 80/2/1                          | 40            | 2100         | 90             | This work  |
| Air                  | 16/2/1                          | 29            | 1400         | 85             | This work  |
| Air                  | 300/2/1                         | 26            | 800          | ----           | Ref. 4     |
| Air                  | 16/4/1                          | 30~50         | ----         | 50             | Ref. 5     |
| Air                  | 60/0/1                          | Sub-20        | 1000         | 85             | Ref. 6     |

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