

SUPPLEMENTARY INFORMATION SECTION

Improved Low Temperature Sinter Bonding using Silver Nanocube Superlattices

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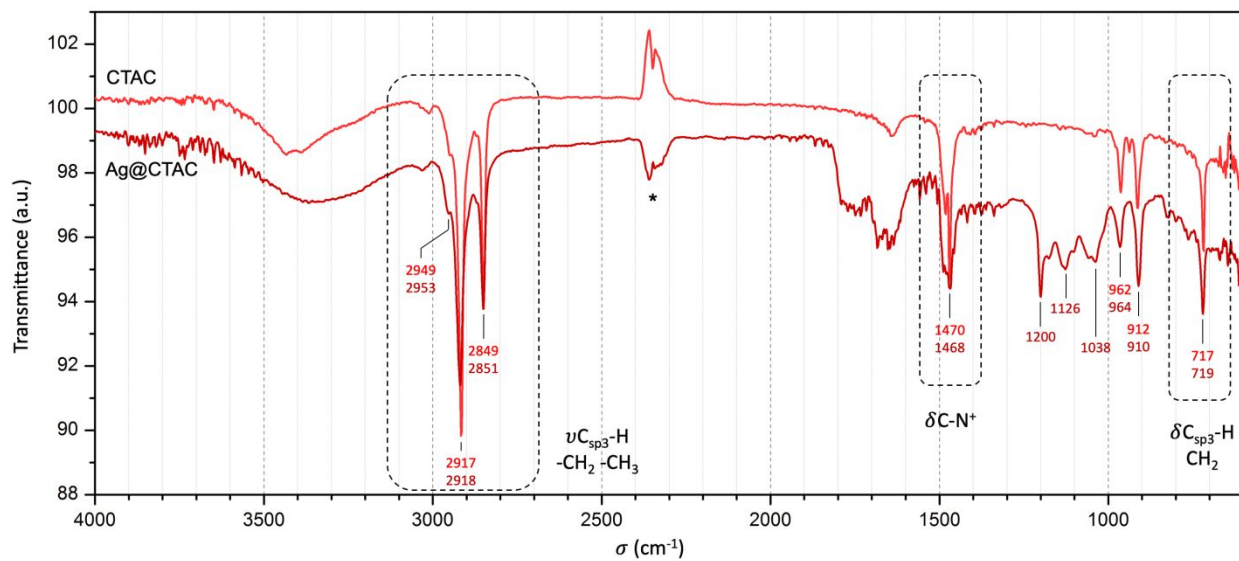


Figure S1. FT-IR profiles of CTAC and CTAC-coated Ag nanoparticles.

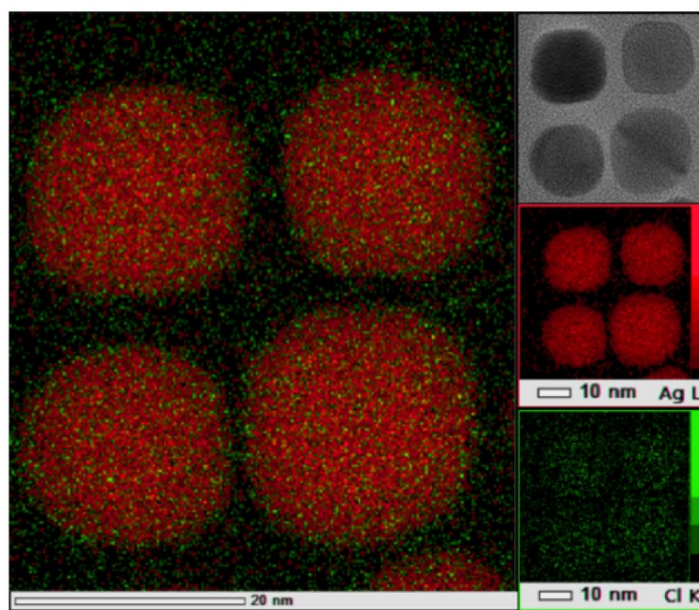


Figure S2. HRTEM image of nanocubes of 20 nm in size and corresponding elemental mapping of Ag (red) and Cl (green).

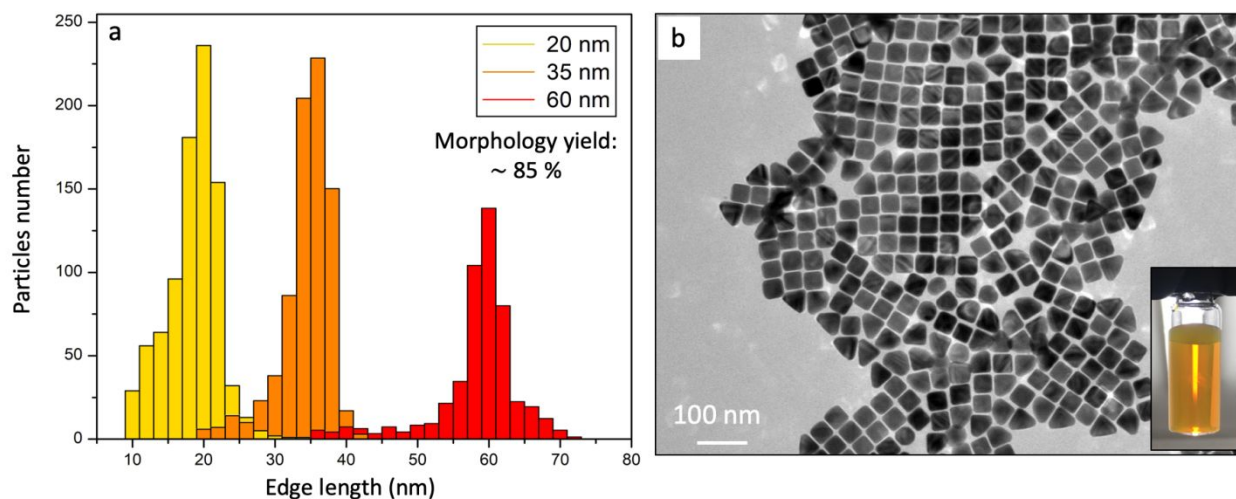


Figure S3. (a) Size distribution of 20, 35 and 60 nm Ag nanocubes. The morphology yield was estimated on the analysis of 400 particles (b) TEM image of 35 nm nanocubes. Inset : photograph of the corresponding solution.

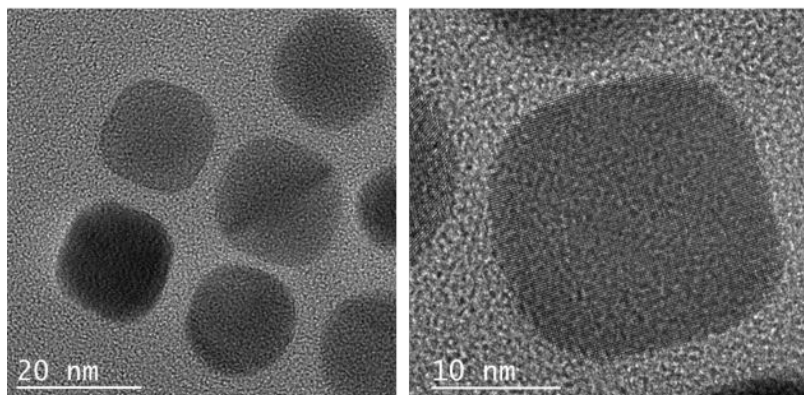


Figure S4. HRTEM images of cubes of edge length, L , smaller than 20 nm.

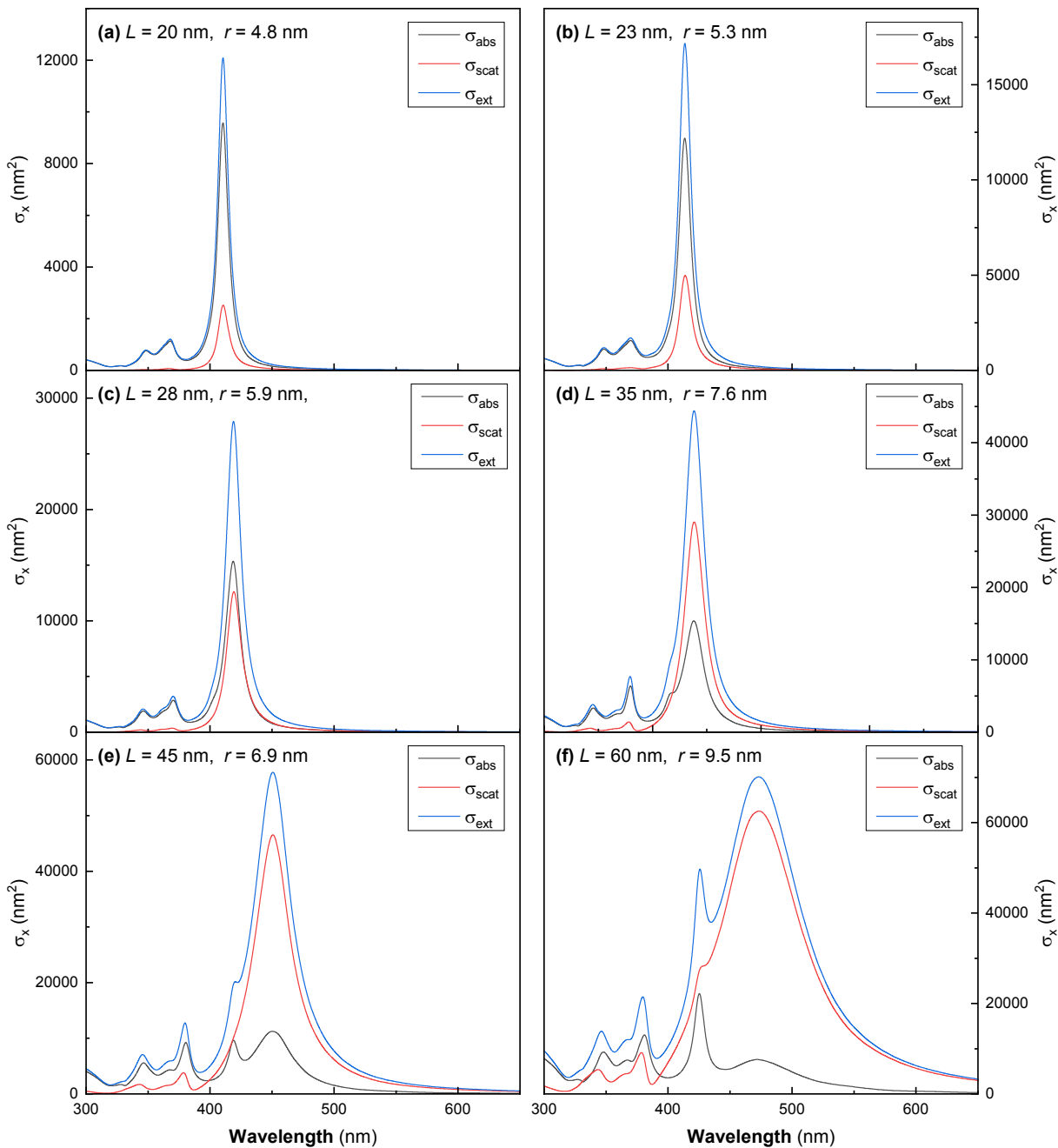


Figure S5. FEM simulated absorption, scattering and extinction cross-sections of AgNCs of varying edge length, L , and radius of curvature, r (specified within each subfigure).

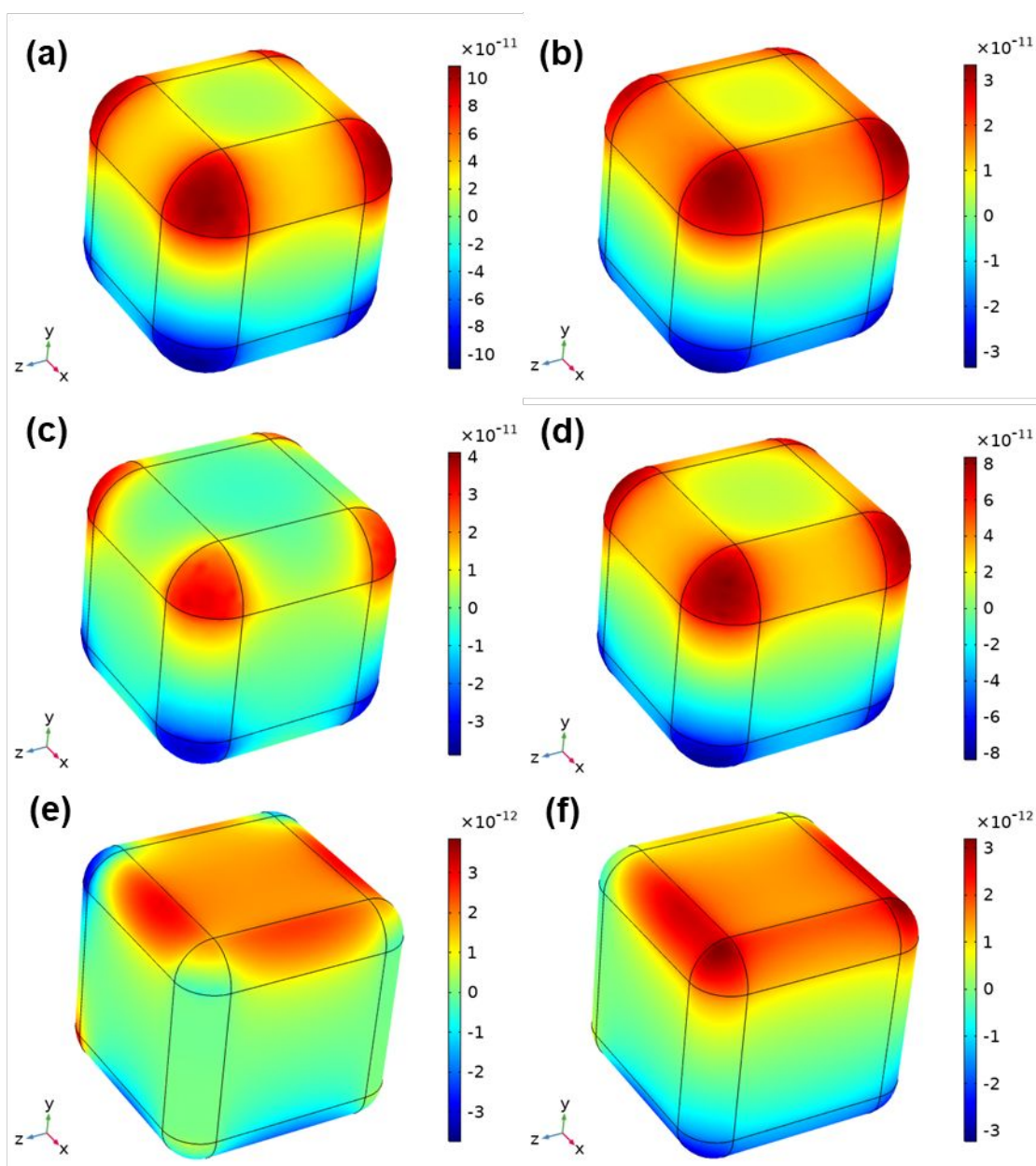


Figure S6. FEM simulated surface charge ($\text{C}\cdot\text{m}^{-2}$) at peak LSPR wavelength for AgNCs of (a) $\{L, r, \lambda_{\text{max}}\} = \{20, 4.8, 411\}$ nm, (b) $\{23, 5.3, 414\}$ nm, (c) $\{28, 5.9, 418.5\}$ nm, (d) $\{35, 7.6, 438\}$ nm, (e) $\{45, 6.9, 450\}$, & (f) $\{60, 9.5, 471\}$ nm. Excitation along the y axis, $|E_0| = 1 \text{ V}\cdot\text{m}^{-1}$.

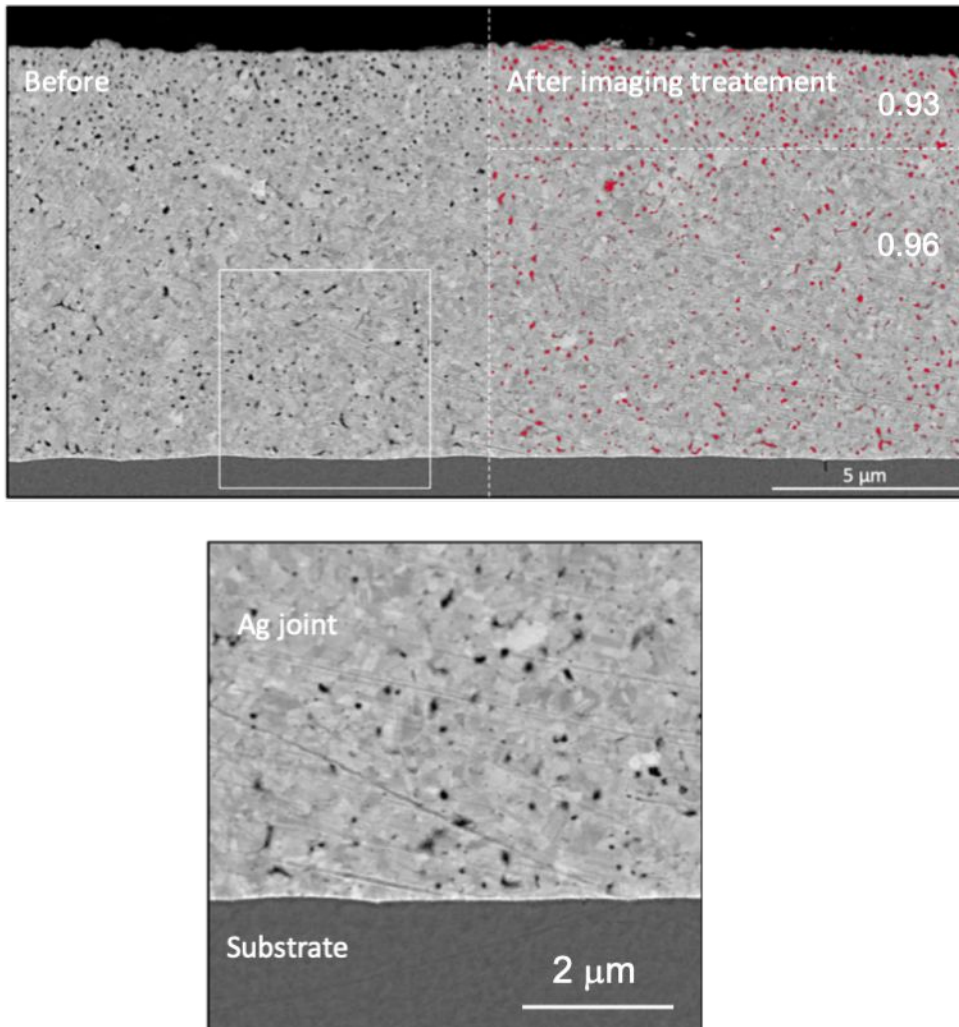


Figure S7. Example of an imaging treatment made for evaluating the density of the sintered joint (185° (2H)). (top) SEM cross-sectional image of a joint before and after imaging treatment with IMAGE J software. Red color is used to indicate the macro-porosities within the joint. (bottom) A magnified section of the area close to the substrate.

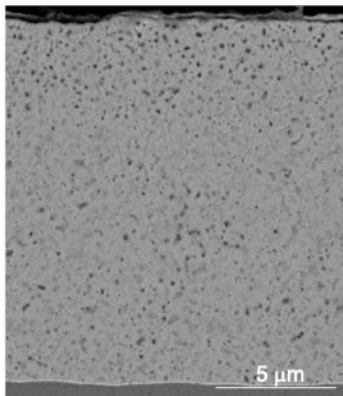


Figure S8. SEM cross-sectional image of a joint based on arrays of cubes ($L = 20$ nm) after sintering, at 150°C , for 2 h.

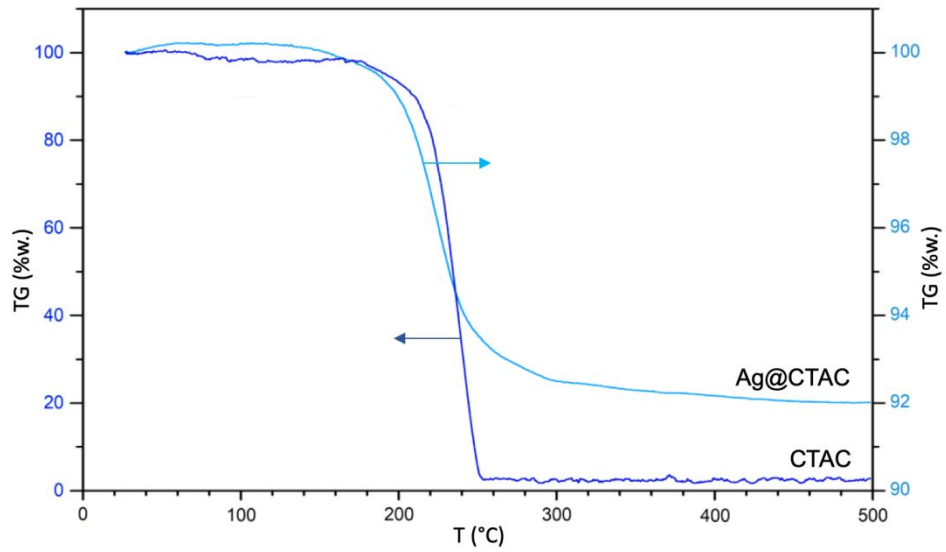


Figure S9. TGA curve of CTAC and CTAC-capped Ag nanocubes under air gas flow.

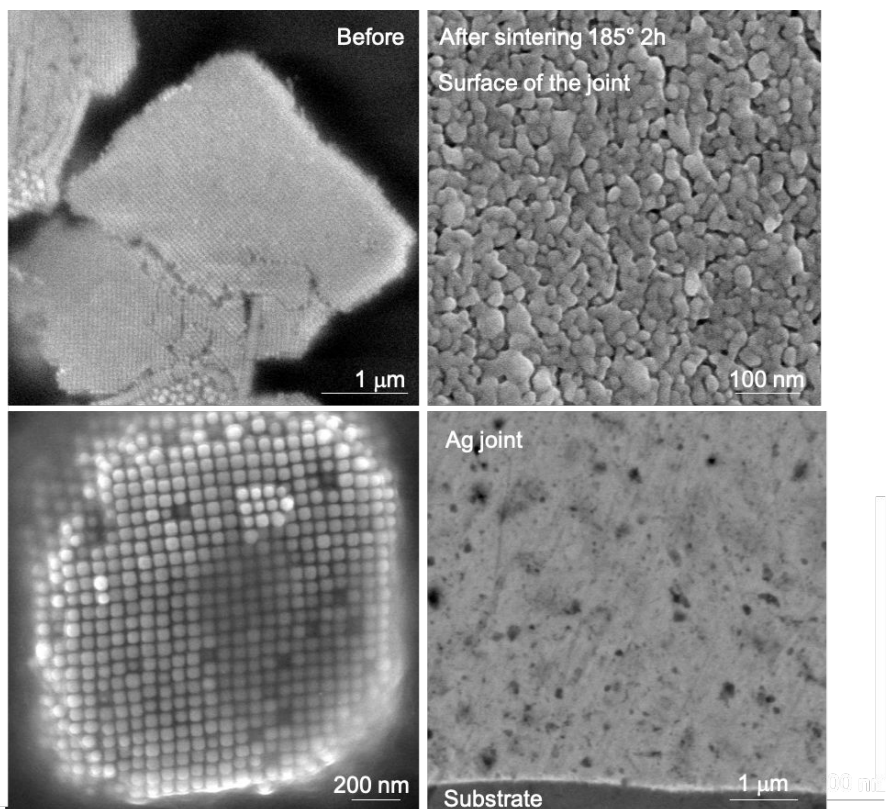


Figure S10. SEM images of packed Ag nanocube superstructures ($L = 60$ nm) before (left) and after (right) heating at 185°C (cross-section and surface views of the sintered layer).

Table S1. Conductivity of metallic joint formed from arrays of cubes of different lengths after sintering, at 185°C (2 hours).

| Cube edge length (nm) | 45 | 60 |
|--|---------------|---------------|
| Resistivity ($\mu\Omega\cdot\text{cm}$) | 3.9 ± 0.1 | 4.2 ± 0.2 |

