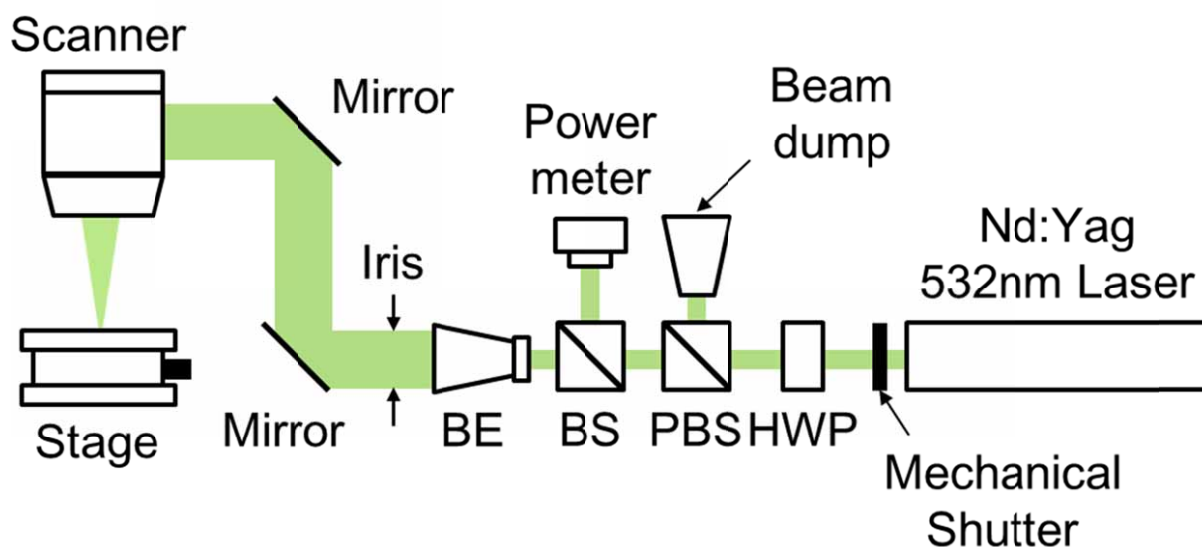
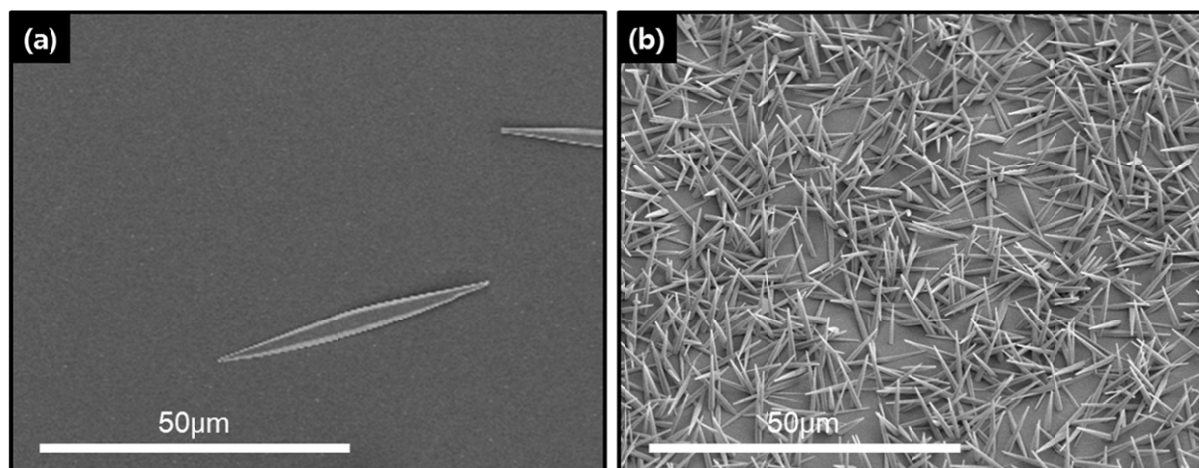


Supporting Information

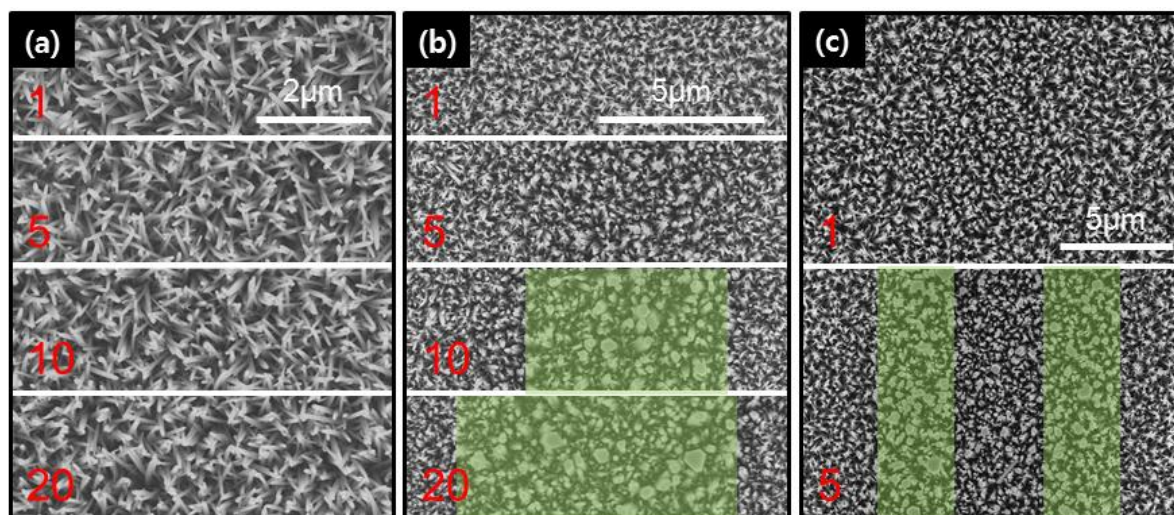


Supporting Figure S1. Schematic diagram of the optics system for the laser decomposition of zinc acetate and SLS process of metal nanoparticle. Nd:YAG 532nm CW laser passes through half-wave plate (HWP) to change its polarization. The laser power incident on the scanner can be controlled by rotating HWP because only p-component is transmitted through polarized beam splitter. (PBS) Another beam splitter (BS) is placed afterwards to measure the laser power in real time. The laser beam is then expanded 5 times using a beam expander (BE) and its size is adjusted before it enters the scanner by an iris.

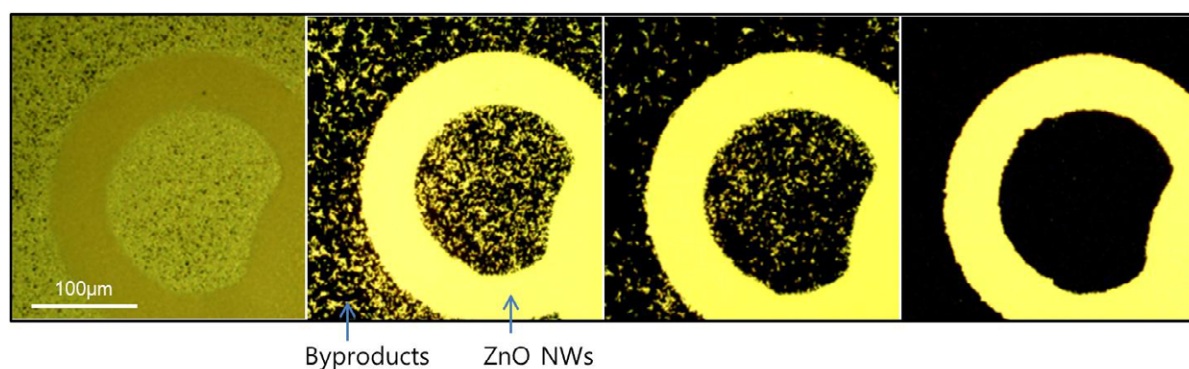


Supporting Figure S2. The SEM pictures of the byproduct ZnO micro-rods grown on (a) a bare substrate and (b) a zinc acetate treated substrate (without thermal or laser decomposition procedure) after the bulk hydrothermal ZnO growth. For the bare substrate, the ZnO structures are probably synthesized in a precursor solution by

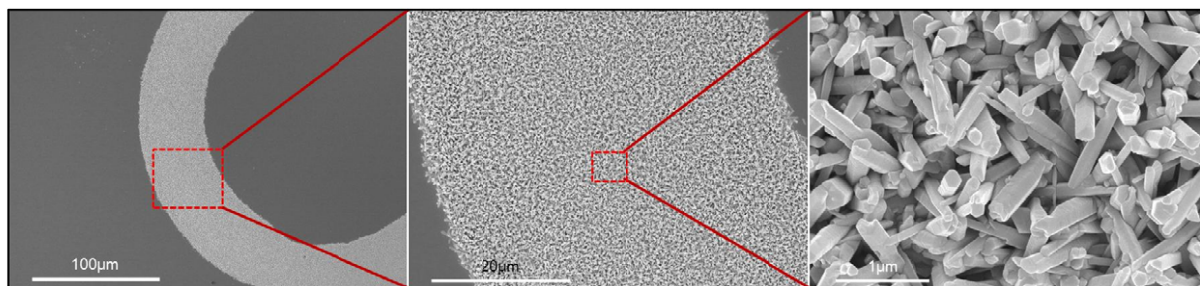
homogeneous nucleation and later attached to the substrate during the growth. The ZnO structures with similar geometry, but at a much higher density and smaller size, are grown on the zinc acetate treated substrate. These byproduct ZnO micro-rods are possibly initiated from the zinc acetate crystallites adhered on the substrate.



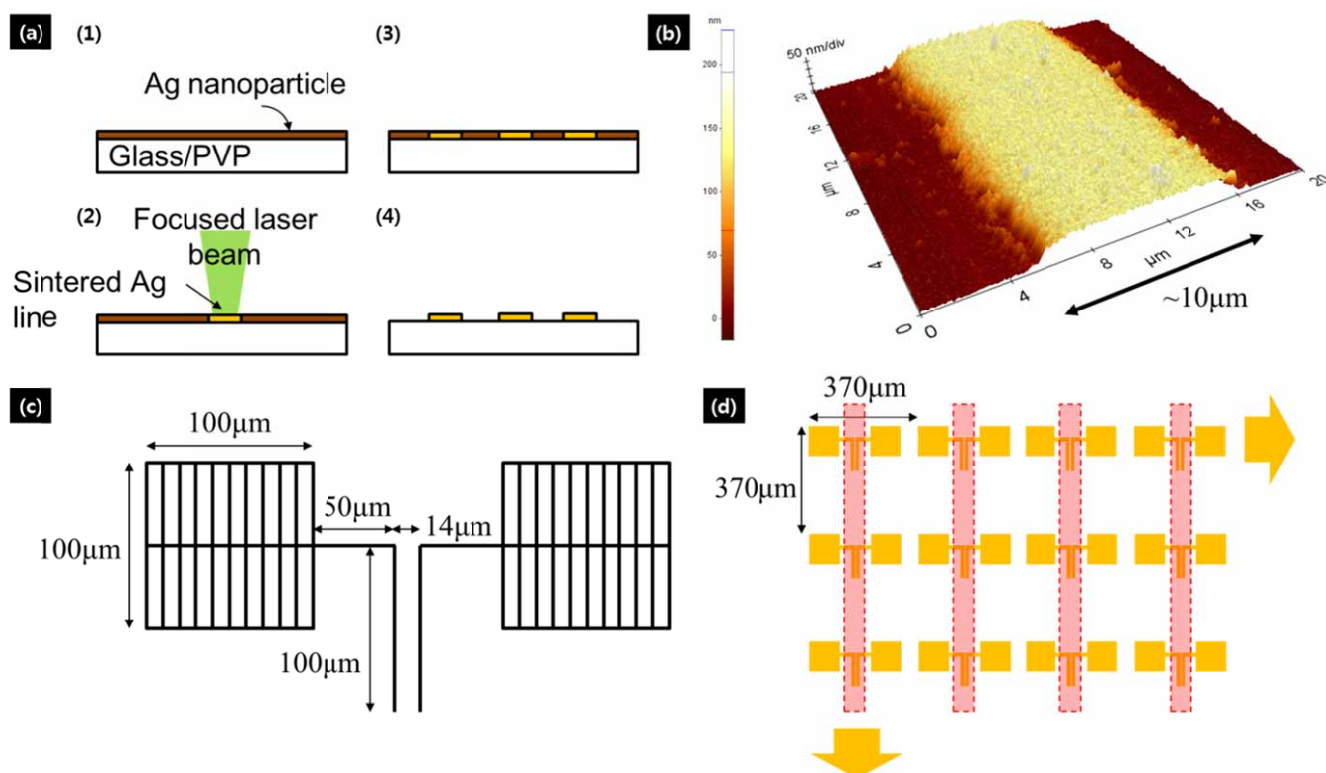
Supporting Figure S3. SEM image of ZnO NWs grown by laser decomposition of zinc acetate at (a) 100mW, 50mm/s (b) 166mW, 5mm/s and (c) 200mW, 1mm/s. The laser is scanned along vertical direction, and the number of multiple scanning is displayed as red letter in each box. For relatively low power, multiple scanning does not affect the final ZnO NW shape. However, ZnO NWs with thicker diameter are occasionally grown at a higher laser power. The area where the thicker NWs are frequently found is denoted with green colored boxes. The thickening of NW is rather suppressed when the power exceeds certain laser power threshold value as it is observable at the central area in (c).



Supporting Figure S4. Dark field optical microscope image of the micro-patterned ZnO NW arrays on a circular line during the sonication procedure at 0s, 15s, 30s and 1min from left.



Supporting Figure S5. SEM images of the patterned ZnO NW with sonication time >1hr



Supporting Figure S6.(a) Process flow for SLS of Ag NP. (i) Ag NP ink is spin-coated on glass/PVP substrate. (ii-iii) Ag NP thin film is selectively transformed into conductor line by focused laser beam scanning with the optical setup illustrated in Figure S1. (iv) The unsintered Ag NP ink is removed by cleaning with organic solvent (toluene). (b) AFM profile of a single conductor line after SLS process. (50mW power, 50mm/s scanning speed) A conductor line with height of ~ 100 nm and width of $\sim 10\mu\text{m}$ is successfully fabricated and its resistivity is measured to be $< 10\mu\Omega\text{-cm}$. (c) The dimension of a single electrode pad for UV sensor array, where the laser spot is scanned along the black line. The hatch size inside the square box is $10\mu\text{m}$ in order to form a continuous electrode for the electrical characterization. Although the distance between two pads is $14\mu\text{m}$, the resultant gap after the SLS process is $\sim 4\mu\text{m}$, as each scanning reduces the distance by half of its linewidth, which is $\sim 5\mu\text{m}$ for the current sintering condition. (d) The dimension of the UV sensor pad

array on 4cm×4cm glass substrate. The pad illustrated in Figure S6(c) is repeated in every 370μm for both x and y directions to make 108×108 pads (Total 11,664 pads). The growth of ZnO NW is conducted afterwards by selective laser decomposition of zinc acetate on red-boxed region.