Supplementary Material (ESI) for Lab on a Chip

Supporting Information

Wide-field Single Metal Nanoparticle Spectroscopy for High Throughput Localized Surface Plasmon Resonance Sensing

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Data Processing

Single AgNPs are first localized using a detection algorithm (Matlab) (Jaqaman et al, Nature Methods 5, 695 – 702, 2008). In the program, each diffraction limited spots, corresponding to the 0^{th} order image, is fitted to a 2D Gaussian and its centroid location is identified. Only the 0^{th} order image is localized using this algorithm. Another Matlab program is written to trace the corresponding 1^{st} order image based on the calibration. Since each diffraction limited spot occupies approximately 5 by 5 pixels, the spectra of individual nanoparticles are calculated by summing 5 horizontal rows of the first order image (2 rows above the centroid and 2 rows below

the centroid). Typical variation of λ_{max} measured between different frames is within 3 pixels. No frame averaging is done for the data presented.

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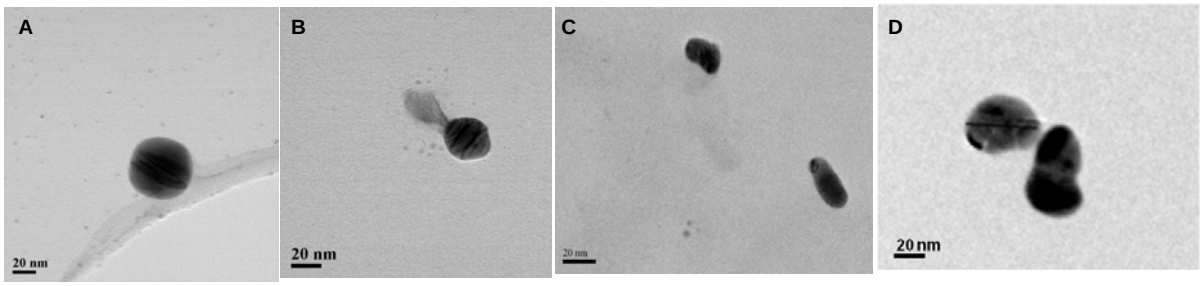

Figure S1. TEM images of AgNPs of different shapes (A) sphere, (B) plate, (C) rod, and (D) dimer

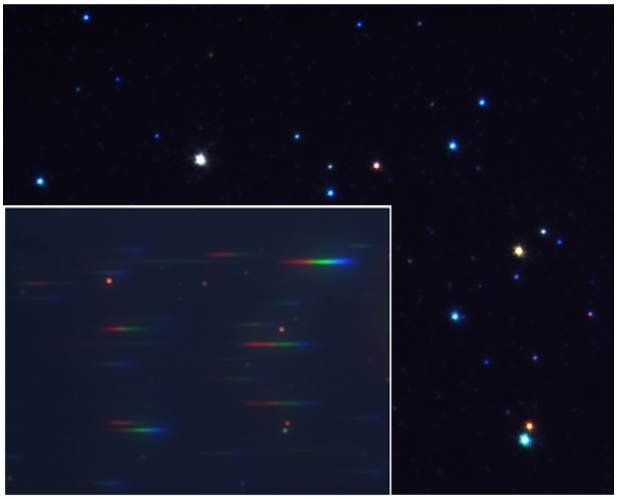

Figure S2. Individual silver nanoparticles under dark-field illumination. Most NPs appear as blue color diffraction limited spots on the CCD camera. Insert shows the image after the insertion of the diffraction grating.

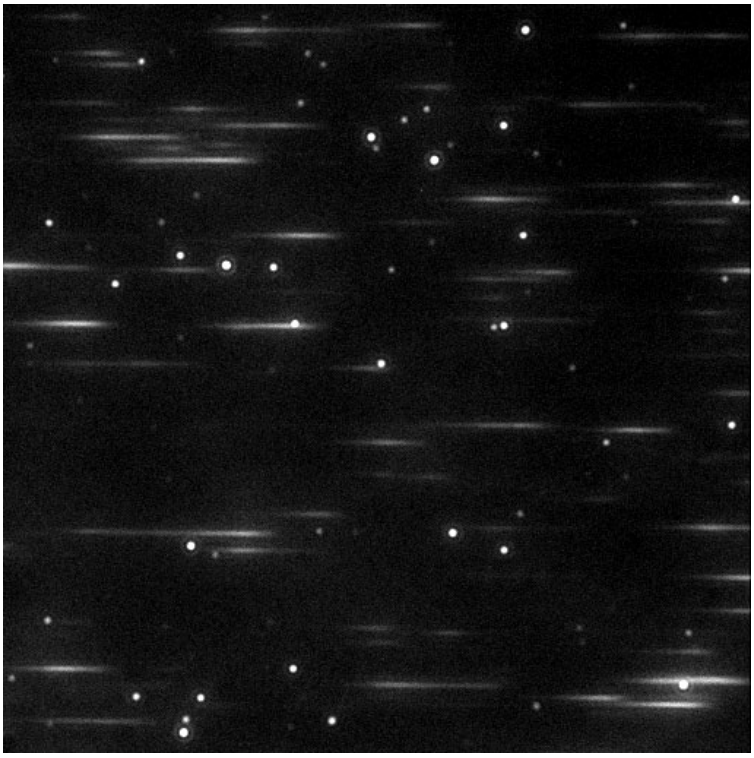

Figure S3. Typical CCD field of view showing that up to ~40 AgNPs with their respective spectra can be identified in a single exposure.

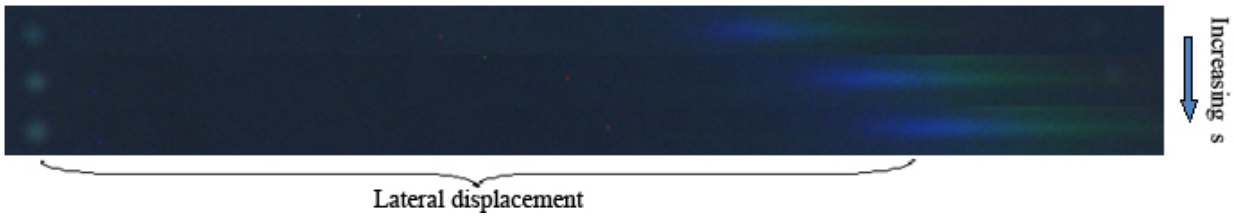

Figure S4. The lateral displacement, defined as the distance between the 0^{th} order and 1^{st} order image, is observed to increase as the distance between the grating and the objective (s) is increased.