Electronic Supplementary Material (ESI) for Nanoscale

Supporting information for

Reduced linewidth multipolar plasmon resonances in metal nanorods and related applications

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More examples of dark-field scattering spectra of Ag nanorods are shown in Figs. S1-S4. For long nanorods as shown in Figs. S3 and S4, most of the spectra show a decrease in the peak intensity for LSPR in the near IR region. This is likely due to a reduction in the collection efficiency of the spectrometer. The image of a long nanorod in the plane where a slice is located is larger for longer wavelength due to the dispersion of the objective. Then, part of the scattered light from the nanorod would be cut by the slice so that the observed scattering intensity is reduced in the near IR region. Note that this would not be the case for shorter nanorods or for those long nanorods that have their images aligned parallel to the slice. This may explain why the behavior appears in most long nanorods but some of them are exception.

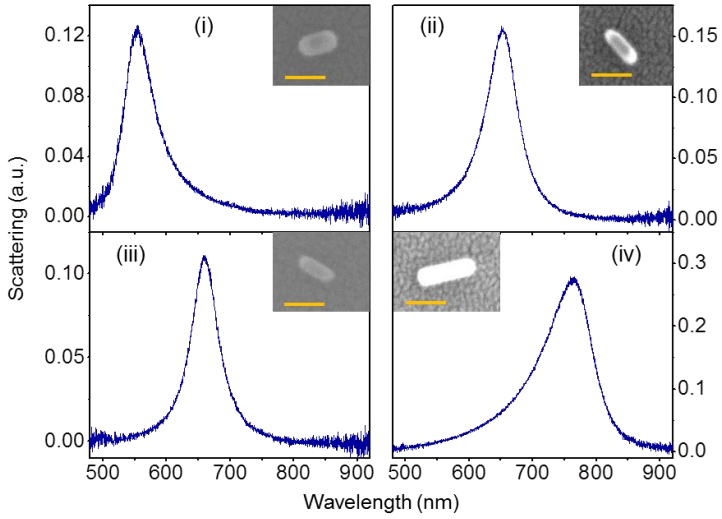

Fig. S1 Dark-field scattering spectra of single Ag nanorods: (i) D = 41 nm, L = 86 nm, (ii) D = 26 nm, L = 91 nm, (iii) D = 24 nm, L = 79 nm and (iv) D = 31 nm, L = 135 nm. The SEM images of the corresponding rods are shown in the insets. The scale bars are 100 nm. The diameters and lengths of nanorods were measured from SEM images after subtracting 12 nm to account for the sputtered Au layer.

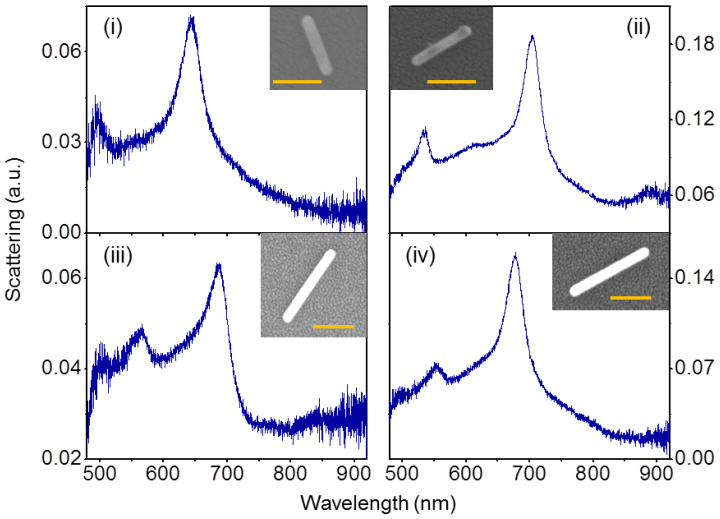

Fig. S2 Dark-field scattering spectra of single Ag nanorods: (i) D = 38 nm, L = 247 nm, (ii) D = 30 nm, L = 265 nm, (iii) D = 38 nm, L = 410 nm and (iv) D = 39 nm, L = 427 nm. The SEM images of the corresponding rods are shown in the insets. The scale bars are 200 nm.

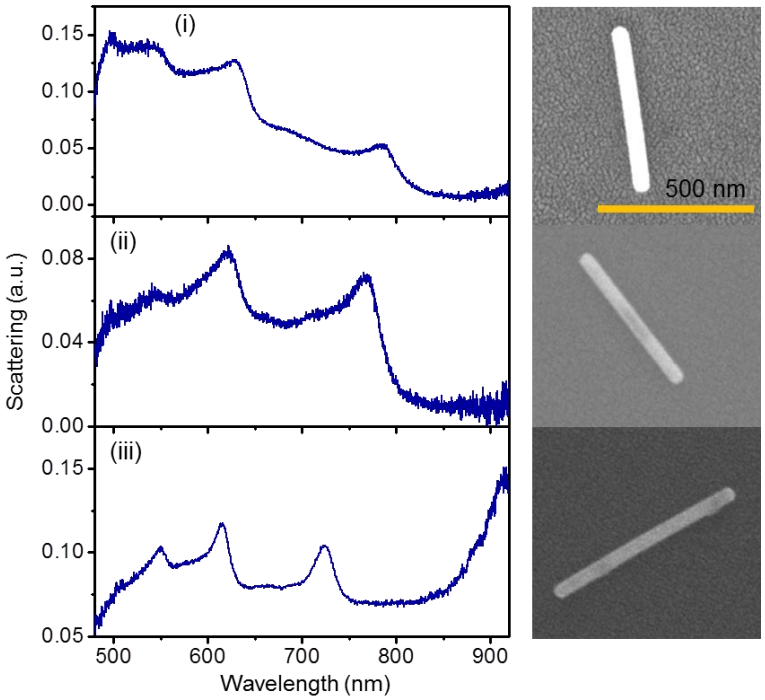

Fig. S3 Dark-field scattering spectra of single Ag nanorods: (i) D = 44 nm, L = 521 nm, (ii) D = 35 nm, L = 496 nm and (iii) D = 34 nm, L = 649 nm. The SEM images of the corresponding rods are shown to the right. The scale bar applies to all three images.

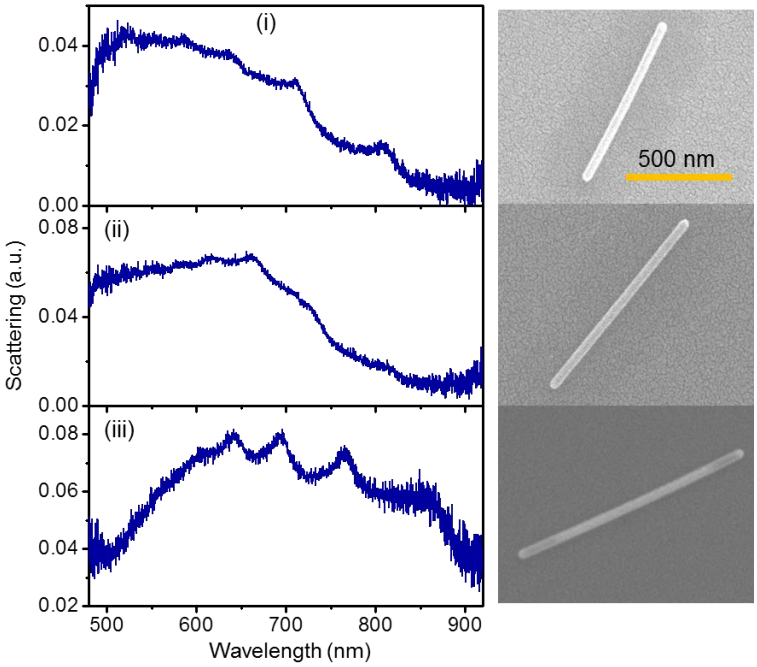

Fig. S4 Dark-field scattering spectra of single Ag nanorods: (i) D = 32 nm, L = 821 nm, (ii) D = 34 nm, L = 1007 nm and (iii) D = 34 nm, L = 1155 nm. The SEM images of the corresponding rods are shown to the right. The scale bar applies to all three images.

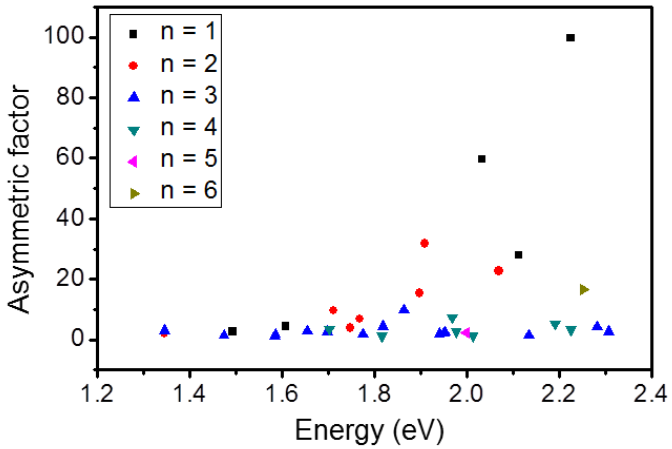

Fig. S5 Asymmetric factor q as a function of energy, obtained from the fits to the resonant peaks in the dark-field scattering spectra.