

Fast detection to single nanoparticle and virus by using surface Plasmon scattering imaging

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It's difficult to detect single nanoparticle and virus because their sizes are too fine, which is below 100nm. However, nano pollutants and virus in the water and atmospheric environment have a serious impact on human life. We present a method to detect the single nanoparticle and virus by direct imaging the surface plasmon scattering induced by nanoparticle or virus. The schematic is shown in Figure 1. Experimentally, single 39nm polystyrene particle has been “seen” (as shown in Figure 2), and three viruses, e.g. T4 phage, PR8 influenza virus and EV71 enterovirus, have been detected in PBS buffer solution. This method is fast, high sensitivity, simple and low cost, which has a potential application to in-situ monitor the water and atmospheric environment.

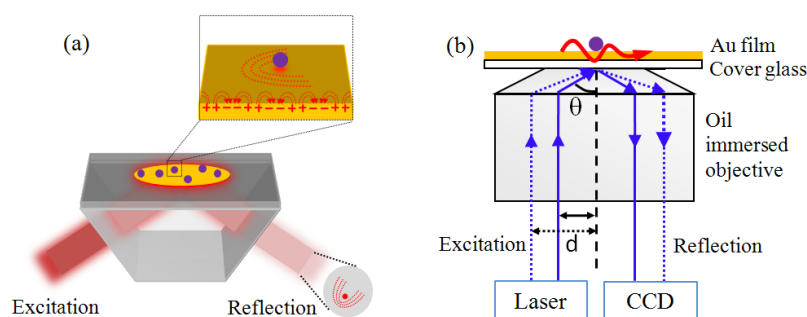


Figure 1 (a) Physical mechanism of surface plasmon scattering imaging; (b) Experimental schematic of imaging the single nanoparticle.

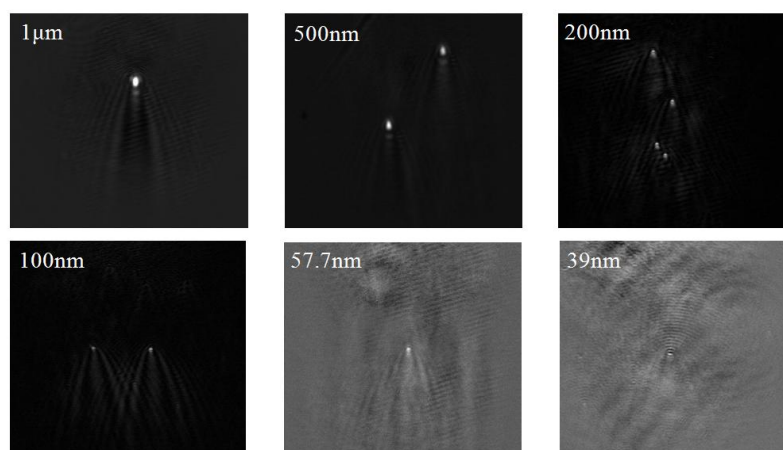


Figure 2 Imaging of surface plasmon scattering induced by particles with size of 1μm, 500nm, 200nm, 100nm, 57.7nm, and 39nm.