

Supplementary information:

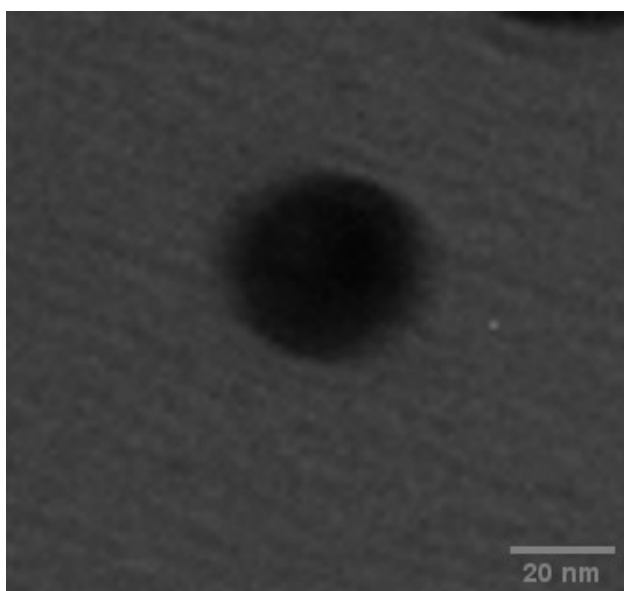


Figure S1: TEM image of gold nanoparticle

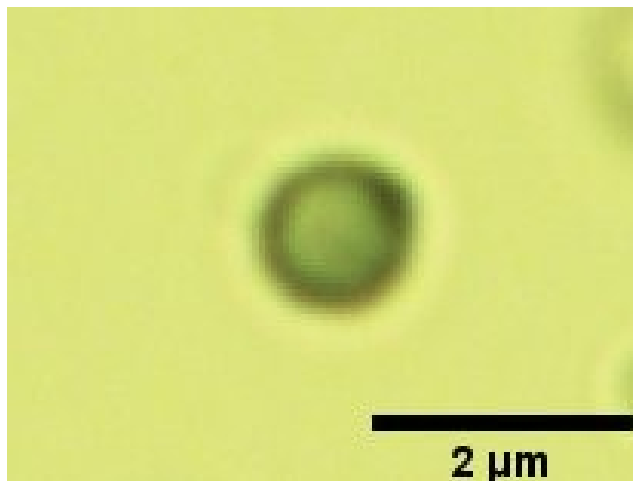


Figure S2: Microscope image of gold nanoparticle attached SiO₂

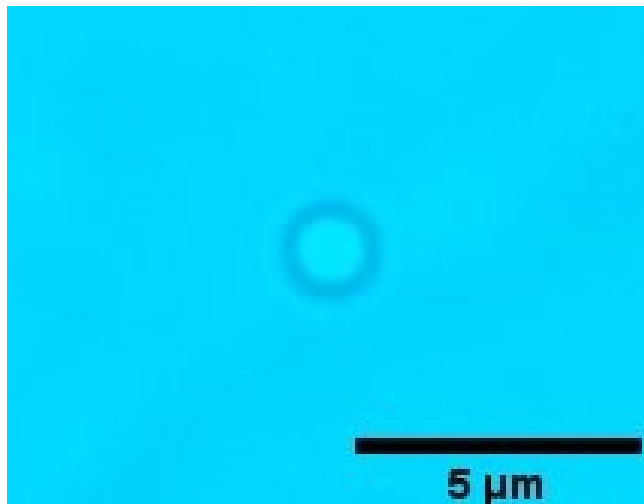


Figure S3: Microscope image of optically trapped SiO₂ particle

Table 1: The Raman peak assignment of Crystal violet

CV Raman Shift(cm ⁻¹)	Assignment
411	Out-of-plane bending mode of C-C _{center} -C
431	Bending mode of C-N-C
519	Bending mode of C-N-C
564	Out-of-plane aromatic C-C deformation
725	C-N-C symmetric stretching vibration
805	Ring C-H bending
907	C-H out-of-plane bending modes
1169	C-H in-plane bending mode
1368	Stretching vibration of nitrogen and phenyl ring

1525	Asymmetric stretching of phenyl ring and nitrogen
1580	In-plane aromatic C-C
1610	In-plane aromatic C-C

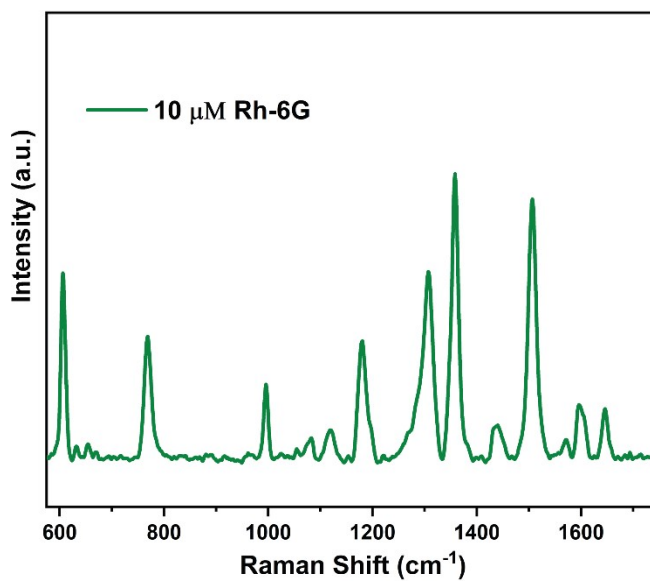


Figure S4: Raman spectra of Rh-6G solution (concentration 10 μM) on which the Ag nanoparticle coated silica particle is optically trapped.