Supporting Information

Dual-mode biosensor combining transition metal carbonyl-based SERS and colorimetric readout for thiol detection

**Figure S1:** HR ESI-MS for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2^2$ with cysteine (top) with calculated isotopic pattern (bottom), **Figure S2:** HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2^2$ with N-(tert-butoxycarbonyl)-L-cysteine methyl ester (top) with calculated isotopic pattern (bottom), **Figure S3:** HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2^2$ with N-acetyl-L-cysteine (top) with calculated isotopic pattern (bottom), **Figure S4:** HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2^2$ with GSH (top) with calculated isotopic pattern (bottom), **Figure S5:** The reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2^2$ with 20 amino acids, **Figure S6:** UV-Vis measurements for quantitative thiol detection.
Figure S1. HR ESI-MS for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2$ with cysteine (top) with calculated isotopic pattern (bottom).

Figure S2. HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$($\mu$-H)$_2$ with N-(tert-butoxycarbonyl)-L-cysteine methyl ester (top) with calculated isotopic pattern (bottom).
Figure S3. HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$(μ-H)$_2$ with N-acetyl-L-cysteine (top) with calculated isotopic pattern (bottom).

Figure S4. HRMS-ESI for the reaction of Os$_3$(CO)$_{10}$(μ-H)$_2$ with GSH (top) with calculated isotopic pattern (bottom).
Before injection

Just after injection

A10 = Alanine  
A9 =  
A8 = Aspartic  
A7 =  
A6 = Glutamine  
A5 = Glutamic acid  
A4 = Glycine  
A3 = Isoleucine  
A2 = Phenylalanine  
A1 = GSH
B10 = Tryptophan  
B9 =  
B8 =  
B7 = Lysine  
B6 = Histidine  
B5 = Leucine  
B4 = Serine  
B3 = Proline  
B2 = Threonine  
B1 = Cysteine

Figure S5. The reaction of Os₈(CO)₁₀(μ-H)₂ with 20 amino acids. (note: a video recording of color change progression of 20 types amino acids for a few seconds is provided).

Figure S6 UV-Vis measurements for quantitiave thiol detection.