**Development of Probe-Mediated SERS Sensors for the Detection of Hydrogen Sulfide using Zinc Phthalocyanine-Functionalized Core-Satellite Nanoassemblies**

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The interaction between hydrosulfide anion (HS–) with redox-inactive zinc phthalocyanine (ZnPc) should result in metal ligation through HS– coordination at the zinc center (Hartle, Sommer *et al*. 2014). Herein, we exploited this chemically reversible binding of HS- with ZnPc for the detection of hydrogen sulfide (H2S), a gasotransmitter which is regarded to possess various critical physiological functions (Wang 2014). The research objective is to develop surface-enhanced Raman spectroscopy (SERS)-based sensors that can detect trace amounts of physiological H2S via a ratiometric response with high sensitivity and selectivity. Core-satellite assemblies of gold nanoparticles (AuNPs), which provided electric near-field hotspots between the core-satellite junctions, were used as SERS substrates. Reversible addition-fragmentation chain-transfer (RAFT)-synthesized hyperbranched (HPB) polymeric linkers with surface affinity to gold surfaces were employed to mediate the self-assembly of core-satellites. The effect of surface coverage of HPB polymer and surface-bound ZnPcs on the morphology and SERS activity of core-satellite Au nanoassemblies had also been elucidated. The detection of H2S was achieved by SERS spectrum changes resulting from the chemical and conformational probe changes of the surface-bound ZnPcs (Fig. 1). In summary, ZnPc-functionalized core-satellite nanoassemblies may become an attractive avenue for the development of selective and sensitive chemodosimeters for the detection of physiological H2S.



**Fig. 1**. The sensing mechanism of ZnPc-core-satellite Au nanoassemblies for H2S

**References**

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