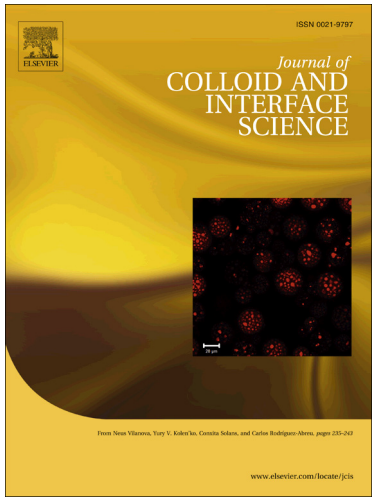


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# A high performance and highly-controllable core-shell imprinted sensor based on the surface-enhanced Raman scattering for detection of R6G in water

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**Abstract**

A novel, sensitive sensor material combined the technique of surface enhance Raman scattering (SERS) and molecular imprinting was prepared. It was used the amino-functionalized $SiO_2$ nanospheres as the supporting materials and anchored Ag nanoparticles on the surface by the function of coordination between $Ag^+$ and $NH_2$-. Then, it was used that the Rhodamine 6G (R6G) as the template, acrylamide (AM) as functional monomer, ethyleneglycol dimethacrylate (EGDMA) as cross-linker, 2,2'-azobis (2-methylpropionitrile) (AIBN) as initiator to prepare the core-shell molecular imprinted polymers. Prominently, the shell thickness could be controlled by the regulation of cross-linker dosage and it was found that the SERS detection signal was most obvious when the shell thickness was about 40 nm. Under the optimal condition, it was presented good linear relationship ($R^2$=0.93) between the Raman signal (at 1505 $cm^{-1}$) and the concentration of the templates and the limit of detection was $10^{-12}$ mol $L^{-1}$. Meanwhile, the selective experiment was proved that this materials owned specific selectivity to the template. It was confirmed that the core-shell molecular imprinted polymers were a kind of highly sensitive and selective sensor materials in the field of R6G detection.

**Keywords:** Ag nanoparticles; surface molecular imprinted; highly-controllable core-shell