Porous magnetic nanostructures for sensing SARS-CoV-2

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The intelligent engineering of nanostructures by means of appropriate surface or bulk functionalization will endow them with multi-functional capabilities, opening new opportunities in the biomedical field such as biosensing, drug delivery, imaging, medical implants, cancer treatment and tissue engineering. Here we demonstrate a cost-effective design approach for preparing nanostructures that show effective potential in rapid detection of SARS-CoV-2, based on the surface-enhanced Raman scattering (SERS) as well as power source for implanted medical devices. The three-dimensional (3D) porous nanoplatform with plasmonic-active nanostructures provides a high sensitivity for the detection of the virus by means of the remarkable SERS signal collection. The outstanding sensitivity of our SERS biosensor was demonstrated with SARS-CoV-2 at the detection limit of 1 fg mL^{-1} and 0.1 pg mL^{-1}, respectively. Our work demonstrates a low-cost design approach for targeted functional nanoplatform with potential for applications in biosensing and bioelectronics.

References

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