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Ag nanoparticles/ZnO nanorods for highly sensitive detection of small molecules with laser desorption/ionization mass spectrometry

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Abstract

In this report, a matrix-free method for high-efficiency detection of small molecules with a Ag nanoparticles/ZnO nanorods (Ag NPs/ZnO NRs) substrate as platform for surface-assisted laser desorption/ionization mass spectrometry (SALDI MS) was carried out for the first time. Ag NPs were decorated on the ZnO NRs substrate by vapor deposition. The charge separation efficiency of composite substrate was optimized by regulating the amount of evaporated Ag NPs. The excellent electron-hole separation efficiency of the Ag NPs/ZnO NRs was measured by surface photovoltage (SPV). For the same analytes, the Ag NPs/ZnO NRs substrate in negative ion mode possesses higher signal intensity and lower limit of detection (LOD). The LOD of Arginine on the Ag NPs/ZnO NRs composite substrate is only 1.0×10^{-15} M, which is 2 orders of magnitude lower than that on the ZnO NRs substrate. The other 3 amino acids (Tryptophan, Tyrosine and Lysine) could be also

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