

Highly Sensitive Immunosensor for Electrical Detection of HIV-1 Pseudovirus Based on Scanning Tunneling Microscopy

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HIV-1 pseudovirus for highly sensitive immunosensor is crucial because HIV-1 pseudovirus is an important challenging marker to detect for early and rapid diagnosis of acquired immune deficiency syndrome (AIDS). A highly sensitive immunosensor based on scanning tunneling microscopy (STM) was developed for the first time to detect living material such as HIV-1 virus by Au nanoparticle and half antibody hybrid complex. The developed surface morphology and the current profile of fabricated immunosensing element were characterized by Raman spectroscopy and investigated with STM to detect antigen-antibody binding events. Using the electrical detection system based on current mapping profile of STM, living material such as virus, HIV-1 pseudovirus, was able to be detected successfully. The proposed technique can be used to easily construct a multiple measurement system in a protein chip and a promising method to construct the highly sensitive and efficient sensor for detecting viruses and other living materials. Acknowledgment: This work was supported by Samsung Research Funding Center of Samsung Electronics under Project Number SRFC-MA1401-04.