단백질-나노입자 코어쉘 구조의 임피던스 신호 분석 및 응용

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This research is to develop a protein sensor through the impedance-SPM system. We modified the polystyrene(PS) nanoparticles surface by immobilization of a model proteins of bovine serum albumin (BSA), fibrinogen (Fib) and immunoglobulin G (IgG). SEM and zeta potential measurements were used for confirming immobilization of protein. These proteins lead to a change in capacitance of the nanoparticle and represent a different impedance signals when AC current applied to. The impedance signals give electrical characteristics of the proteins. Thereby analyses of these signals using an electrical circuit models could be used for the identification of the protein. From the analyses, the capacitances and inductances were different in each protein-immobilized PS nanoparticle. In conclusion, depending on the type of protein that surrounds the surface of PS nanoparticles, different capacitance and inductance values are obtained according to the original properties of the protein. This result is expected to be applicable protein sensor in the future.