Silver encapsulated MoS_2 hybrid nanoparticle for detection of dopamine

손주형, 신재욱, 윤진호, 신민규, 최정우†
서강대학교
(jwchoi@sogang.ac.kr†)

In our central nervous system, dopamine is an important neurotransmitter as an indicator of several neurological disorders such as Parkinson's disease. Since the dopamine level is the significant factor for diagnosis of various neurological disorders, metal nanoparticles such as gold and platinum are commonly used for detecting dopamine by the electrochemical system. However, the methods of dopamine detection have limitations such as low sensitivity and low linearity at low concentration of dopamine. In this study, the biosensor composed of $Ag@MoS_2$ hybrid nanoparticle was used for enhanced electrochemical detection of dopamine with high sensitivity and selectivity. The electrochemical signal enhancement was confirmed by CV and the selectivity was confirmed by amperometric i-t curve technique with continuous addition of dopamine, AA and UA. The detection limit of the biosensor composed of $Ag@MoS_2$ hybrid nanoparticle was 0.2 μM and the linear range was 0.2-50 μM. In conclusion, our newly developed electrochemical biosensor, consisting of $Ag@MoS_2$ hybrid nanoparticle, could be used as a biosensing platform to develop the various biosensors with electrochemical signal enhancement.