

PE07

ELECTROCHEMICAL MICROGRAVIMETRY USING
DIAMOND-LIKE CARBON ELECTRODES

유사다이아몬드 탄소 전극을 이용한 전기화학미세중량법

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Conducting diamond-like carbon films on quartz crystal electrodes were prepared by laser ablation of graphite. They were stable in many solvents including water, dichloromethane, and acetonitrile. Their potential window is much wider than those of the metal electrodes usually used in quartz oscillators and the electron transfer rate at the electrode surface is fast enough to perform electrochemistry. In dichloromethane with 0.1 M (n-Bu)₄NClO₄, DLC electrodes could scan the potential range between +2.0 and -2.0 V to record cyclic voltammetric (CV) curves of [Ru(bpy)₃]^{3+/2+}. We also showed that the DLC works satisfactorily as a useful electrode material for electrochemical microgravimetry by examining the deposition-dissolution of [Ru(bpy)₃]³⁺ in dichloromethane solutions. It was found that the oxidized [Ru(bpy)₃]³⁺ have two different fates, that is, some of them make deposits on the DLC electrode and the rest diffuse out of the electrode surface instead of depositing. Based on the frequency data representing the amount of deposit only and the oxidation charge data reflecting the amount of oxidized species, deposits were found to have the average composition of [Ru(bpy)₃](ClO₄)₃ 1.7(n-Bu)₄NClO₄.