

## 백금전극에서의 전기화학적 우라늄환원

### Electrochemical Reduction of Uranium(VI) at a Platinum Electrode

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#### 요약

인가전위에 의존적인 전기화학적 우라늄환원반응은 전극재료의 변화에도 영향을 받았고, 수소발생반응에 영향을 주었다. 그리고 우라늄환원반응에 흡착단계가 포함되어 있음을 백금-수정진동자저울(QCM)로 확인하였다. 이러한 실험결과로부터 흡착된 수소원자(수소라디칼)가 환원반응에 개입한다는 메커니즘을 제시하였다. 한편 백금전극에서 전위에 따른 환원속도와 전류효율을 전기화학적 및 분광학적 방법으로 산출하여, 최적의 환원조건을 도출할 수 있게 하였고, 환원속도저하영역(-0.24V at Pt electrode, -0.50V at Ti electrode in 1.0M perchloric acid medium)의 발생을 수소라디칼 반응경로로 설명하였다.

#### Abstract

The electrochemical reduction of Uranium(VI) was influenced on not only applied reduction potential, but working electrode material, and it subsequently gave an effect on the rate of the hydrogen evolution. And an adsorption step was observed during the electrochemical reduction of Uranium(VI) at the platinum electrode by the electrochemical quartz crystal micro balance. From these results, a reduction mechanism, which the adsorbed hydrogen atom (hydrogen radical) involves in the Uranium reduction process, was proposed. The reduction rate and current efficiency at the platinum electrode, which can be used to determine optimal reduction condition, were also evaluated according to the applied electrode potential by electrochemical and spectroscopic techniques, and the presence of the rate dent region(-0.24V at Pt electrode, -0.50V at Ti electrode in 1.0M Perchloric acid medium) was interpreted by the hydrogen radical reaction paths.