

니켈의 不動化膜에 대한 光學的 電氣化學的 研究

白 雲 基

서강대학교 화학과

Optical and Electrochemical Study of Passive Film on Nickel

Woon-kje Paik

Department of Chemistry, Sogang University, Seoul, Korea

要 約

수산화나트륨 용액에서 니켈 표면에 형성되는 양극 산화막의 성질과 두께를 알기 위하여 反射率 측정과 橢圓偏光反射測定을 同時에 하는 實驗方法을 썼다. 높은 순도의 다결성 니켈을 얻어낸 후 부동화를 일으키는 퍼텐셜 범위 내의 여러 퍼텐셜에서 전기화학적으로 표면막이 생기도록 한 후, 자동화된 타원편광반사법 측정기를 써서 반사율(R)과 타원편광반사법 파라미터(Δ , ψ)들의 변화를 기록하였다.

이 기록된 실험치 들로부터 표면 막의 두께와 광학상수(n , k)들을 계산한 결과 $n=2.0\sim 2.5$, $k=0\sim 0.5$, 두께 $=10\sim 20\text{\AA}$ 의 결과를 얻었다. 이러한 결과와 電氣化學的 측정치를 함께 고려하여 표면막은 $\text{Ni}(\text{OH})_2$ 와 비슷한 조성을 가지되 일부는 탈수되어 NiO 로 된 것으로 추정되었다.

Na_2SO_4 를 被覆한 니켈의 加速酸化

金 大 龍

慶北大學校 工科大學 金屬工學科

Accelerated Oxidation of Na_2SO_4 Coated Nickel

Kaj-Ryong Kim

Department of Metallurgical Engineering, College
of Engineering, Kyungpook National University

Abstract

The accelerated oxidation of Na_2SO_4 coated nickel has been studied at 1014°C , 932°C , and 854°C in dynamic air. It has been observed that a linear oxidation law is obeyed during an initial accelerated oxidation stage, however after a long time oxidation, the oxidation rates were diminished and parabolic oxidation behavior, is shown because of the formation of inner protective oxide layer.

The oxide layers which were formed during an accelerated oxidation were porous and lamellate structures and sulfide phase was observed at inner sides of the porous oxide layer and grain boundaries of nickel matrix.

Based upon the above results, the mechanism of the accelerated oxidation of nickel by Na_2SO_4 is considered as follows. (a) Fracture or dissolution of initially formed nickel oxide film occurs. (b) Nickel is sulfidized reacting with Na_2SO_4 or SO_2 and nickel dissolves into the fused sulfide phase. (c) Dissolved nickel ions react with oxygen in the sulfide phase or just outer sides of the sulfide phase and porous oxide layers are formed. It is also considered that inner protective oxides are formed when the amount of sulfide phase is below a critical amount, since sulfides are consumed by oxidation oxidation or dissolving into porous oxide layers.