

알루미늄 도핑에 따른 리튬이차전지용 실리콘 박막의 전기화학적 특성
Electrochemical Properties of Aluminum doped Silicon film as
Anode Materials for Li Ion Batteries

김영재, 박종완*†

한양대학교 공과대학 신소재공학과 박막재료연구실, *한양대학교 공과대학 신소재공학과
(jwpark@hanyang.ac.kr†)

In search of new non-carbonaceous materials for lithium ion batteries, silicon has been tested as a possible candidate. In order to examine the intrinsic properties of this metal versus a lithium electrode at 293K, silicon thin films have been deposited by rf magnetron sputtering system and characterized. Capacities of 1700mAh/g have been measured in films with thickness ranging from 1 to 3 μm . These capacities are probably due to the formation of amorphous Li-Si alloys as indicated by X-ray diffraction analysis and electrochemical measurements. The huge stress induced by volume changes upon cycling have been evidenced by scanning electron microscopy observations. After a few cycles, silicon films lost their own capacity. As aluminium was doped, silicon films could endure the stress induced by volume changes during the cycles. Aluminium as a doping material helped silicon retain its capacity and overcome stress from the large volume change. Aluminium doped silicon appears as a good material as negative electrode for lithium ion batteries.