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Anode Characteristics of Cobalt Oxide Thin Films for Microbattery Fabricated by rf Magnetron Sputtering

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Recent research on the anode material for lithium ion battery has been focused on carbonaceous materials and alternative materials like tin oxide.[1] Carbonaceous materials has high stability, but low volumetric capacity mainly due to large initial irreversible capacity. There have been many studies on new materials for lithium secondary batteries has recently attracted much attention. Cobalt oxide anode material has a good electrochemical capacity and high recharging rate.[2]

In this work, the effect of heat treatment on the electrochemical characteristics of cobalt oxide as anode material was investigated.

To investigate the effect of the heat treatment on the electrochemical characteristics of cobalt oxide as an anode material, RTA heat treatment was performed. After the RTA treatment CoO thin film had wire-liked particles.

As the heating temperature increased, the number of particles and surface roughness were larger than those of as-deposited film.. respectively. Discharge capacity of the annealed CoO thin film was larger than the as-deposited CoO thin film. cycle performance is found to be dependent on cut-off voltage and cut off voltage range. To improve capacity retention, the cobalt oxide films with different heat treatment temperature, rf power and different amounts of cobalt were prepared with rf magnetron sputtering at room temperature.

Based on this experiment, the correlation between heating temperature and number of particles was validated. And through the heat treatment, structural stability was also able to be attained.