# Effect of electrode area and capacity ratios on electrochemical properties of lithium-ion battery unit cells

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Many battery researchers have already known that electrode area and capacity ratios can also affect the electrochemical properties of lithium-ion batteries (LIBs). However, unfortunately, there are a few research works under constraint conditions [1-2]. Moreover, some electrochemical results were sometimes distorted due to improper cell design, even though taking into consideration the lab-level experiments. So, with the same cathode and anode, we reported that effect of cathode/anode area ratio on electrochemical performance of LIBs [3]. However, when the only area ratio is controlled, the corresponding capacity ratio is also changed. Therefore, the area and capacity should be simultaneously controlled to elucidate each parameter.

In this work, we try to find out the effects of electrode area and capacity ratios, which are controlled at the same time, on electrochemical properties of LIB unit cells. First, while the anode loading level is fixed, the coating thickness and area of anode are controlled like Fig 1 (a) under the same anode density. Secondly, while the area ratio is fixed, the N/P ratio is controlled by increasing the anode thickness. With these unit cells, the initial capacity, coulombic efficiency, rate capability, and cycle life are evaluated at room temperature. Moreover, in order to reveal effects of cell design on resistances, electrochemical impedance spectroscopy is also monitored at specific points.

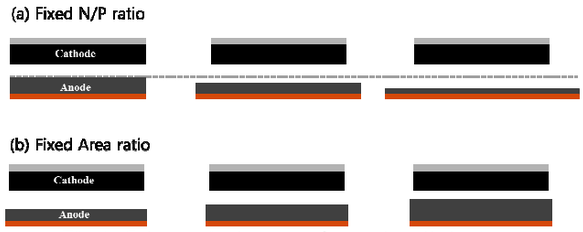


Fig 1. Schematic diagram for each cell design

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