Quantification of the Effect of Contamination in Lithium-Air Batteries

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In Denmark we commit ourselves to use renewable energy, but we still depend greatly on fossil fuels, which supplies are limited. The major chunk of these fuels are used in the transportation sector, therefore streamlining and optimizing of electric-based technologies, so that they can be applied in transportation, is a vital task. One of the potential, and most serious, candidates to replace fossil fuels is a battery, but its design must be developed and improved. Lithium-air batteries still are an under-researched option, but they could potentially have a much bigger storage capacity than any other battery. It is estimated that its energy density could be comparable to that of gasoline. However, it has been proved that water and carbon dioxide in the air contribute to a non-reversible degrading of the battery. This cannot be solved by a simple passive cleansing system, among others because of the molecules' size. It is an effect that has been documented, but not quantified. In order to design an active cleansing system for electric cars, of a reasonable weight and size, it is necessary to establish threshold of carbon dioxide and water in the air before they are absorbed into Li-air battery, so that it can function optimally. Therefore, in my project, I try to expand the existing experimental setup (used in the pilot experiment), in order to demonstrate the unwanted contamination that affects the performance of Li-air batteries. Development of the setup for quantifying the effect of contamination in cells also is developed based on the setup used in the pilot experiment. Degradation effect in Li-air batteries could be quantified by means of optimized pilot setup and the realization of my project is of utmost relevance when it comes to assessing future possibilities.