

How does cold weather affect electric car batteries?

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There is an interesting fact that many people do not notice, that in winter, the phone battery tends to drain faster than usual. This difference is not large and not really obvious, but it is enough for users to notice. So will the same thing happen to electric cars - the type of vehicle that is considered the future of mankind?

How does cold weather affect electric vehicle batteries?

The answer is yes. The cold affects the battery life of electric vehicles, but why? The answer is in the nature and structure of the current Lithium-ion battery.

When the temperature drops low enough, the electrolyte liquid inside an electric vehicle's lithium-ion battery becomes more viscous. This inadvertently slows down the chemical reactions responsible for the conversion of electrons. In simple terms, in a very cold environment, the chemical reactions between the two electrodes inside the battery happen more slowly. This affects not only battery life, but also negatively affects the recharge rate, resulting in a markedly affected electric vehicle range.

Talking about this phenomenon, Professor Anna Stefanopoulou, director of the University of Michigan Energy Institute (USA) said: 'Batteries are like people. That is, they cannot function as well as they should in environments outside a certain temperature range. For electric vehicle batteries, that range is from 40 degrees F (4 degrees C) to 115 degrees F (46 degrees C). Anything above or below this threshold will cause problems.'

Besides, a study has also shown that the power of the electric motor starts to dissipate at 5 degrees Celsius, and from -20 degrees Celsius will lose a lot, because the colder the weather, the lower the battery performance. . However, not all battery technologies have the same drain. Some batteries in more expensive models are better able to withstand extreme temperatures.



To help maintain a good operating temperature, modern electric vehicles are often equipped with specialized battery heating and cooling systems. But those systems take the battery's own power to warm the battery. Simply because unlike a gas-powered engine, an electric motor does not generate heat on its own. Heating the car's cabin, running the battery warming system, and the vehicle's electronics all require electricity. All of that adds up to draining the battery faster than in warm weather.

Also, as mentioned, Lithium-ion batteries take longer to charge as they cool, and the regenerative braking features don't work either. Combined, the adverse effects of cold weather can reduce electric vehicle battery capacity by up to 41 percent.

Solutions

In the next few years, we could see the appearance of EV lithium-ion batteries with no liquid inside, which greatly reduces charge loss in cold weather. However, until this technology becomes widely available, electric vehicle owners need to find alternatives.

There are a few tips to help electric vehicle batteries last longer in cold conditions, or at least to minimize the amount of charge lost. First, don't let the battery drop below 20%, even if you're near a charging station. The car's system must warm up the battery before it can begin to charge, and the battery must have enough power left to run the systems. You'll also need enough electricity to run the cabin heating, especially in very cold weather.

If possible, park your car indoors or under a roof to keep it at a lower temperature. Leaving the car in the sun is also a solution during the day. You should also park your car where there is a usable outlet. Doing so will allow the vehicle to use external power to run the battery warming system instead of the battery itself.

Some electric vehicle models have an 'Eco mode' that automatically adjusts performance to save battery. Setting systems like cabin heaters to lower temperatures will also help optimize battery life. If there are features you don't really need, like seat heating, it's also a good idea to turn them off. In addition, reducing driving speed in cold weather will also result in less battery consumption.

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