Should i use fast charging

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Public "Level 3" DC fast-charging stations can bring an EV"s battery up to 80 percent of its capacity in around 15-45 minutes, depending on the vehicle and the outside temperature (a cold battery charges slower than does a warm one). While most electric car charging is done at home, DC fast charging can come in handy should an EV owner find the state of charge indicator getting nervously low while en route. Locating Level 3 stations is essential for those taking extended road trips.

Whereas home chargers utilize AC current that"s converted to DC power by the vehicle, a Level 3 charger feeds straight DC energy. That allows it to charge the car at a more rapid clip. A fast-charging station is in constant communication with the EV to which it"s connected. It monitors the car"s state of charge and delivers only as much power as the vehicle can handle, which varies from one model to another. The station regulates the flow of electricity accordingly so as not to overwhelm the vehicle"s charging system and damage the battery.

Once charging is initiated and the car"s battery is warmed up, the flow of kilowatts typically increases to the vehicle"s maximum input. The charger will sustain this rate for as long as possible, though it may drop to a more moderate speed if the vehicle tells the charger to slow down so as not to compromise battery life. Once an EV"s battery reaches a certain level of its capacity, usually 80 percent, charging essentially slows to what would then become Level 2 operation. This is known as the DC fast charging curve.

An electric car"s ability to accept higher charge currents is affected by the battery chemistry. The accepted wisdom in the industry is that faster charging will increase the rate at which an EV"s battery capacity will decline. However, a study conducted by the Idaho National Laboratory (INL) concluded that while an electric car"s battery will deteriorate faster if it"s only power source is Level 3 charging (which is almost never the case) the difference isn"t particularly pronounced.

The INL tested two pairs of Nissan Leaf EVs from the 2012 model year that were driven and charged twice daily. Two were replenished from 240-volt "Level 2" chargers like those used in one"s garage, with the other two taken to Level 3 stations. They were each driven on public roads in the Phoenix, Arizona area over the course of a year. They were tested under the same conditions, with their climate control systems set at 72 degrees and the same set of drivers piloting all four cars. The vehicles" battery capacity was tested at 10,000-mile intervals.

After all four test cars had been driven for 50,000 miles, the Level 2 cars had lost around 23 percent of their original battery capacity, while the Level 3 cars were down by around 27 percent. The 2012 Leaf had an average range of 73 miles, which means these numbers represent a difference of around just three miles on a charge.

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It should be noted that much of the INL"s testing over the 12-month period was conducted in extremely hot Phoenix weather, which can inherently take its own toll on battery life, as would the deep charging and discharging necessary to keep the relatively short-range 2012 Leaf running. These temps can be extremely harsh on air-cooled EV batteries like those found in the Leaf.

How much will the battery degrade over time if fast charging is used predominantly? Recurrent set out to answer this question in a recent test involving some Teslas. The chart below captures the results.

The study analyzed charging data from over 12,500 Tesla vehicles in the United States, the rate of range degradation for cars that frequently fast charge is statistically similar when compared to AC charging.

The company, which provides vehicle and battery analysis reports for EVs, compared cars that fast charge at least 90 percent of the time to cars that fast charge less than 10 percent of the time. The results show little to no difference between the two charging methods.

Fast charging in warmer environments can lead to the device heating up. This can lead to faster degradation of battery health. That said, getting a battery replacement after a few years no longer costs a pretty penny.

If you"re brand new to the idea of fast charging, the idea is to provide more power to the battery via a USB port than the connector"s rather pitiful default 2.5W of power. If you"ve ever wondered why a USB port is taking several hours to charge your smartphone, this is why. Without fast charging capabilities, old USB-A ports can be painfully slow. USB Type-C ports can be faster -- up to 15W faster -- but there are no guarantees.

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