

CHARGE ELECTRIC VEHICLES**HUANG NAN, A. ADAMOVICH****Polotsk State University, Belarus**

The advantages and disadvantages of charging stations for electric vehicles, including domestic and public ones, are considered. Methods of charging electric vehicles and the problems of frequent charging are considered. The existing problems arising during the operation of batteries are listed.

The development of electric vehicles includes the research and development of electric vehicles and energy supply systems. The energy supply system refers to charging infrastructure, power supply, charging and battery systems, and energy supply modes. Electric vehicle charging technology is a new field of science and technology. Countries all over the world are involved in the research of charging technology and plan to make charging technology standards, which will take the lead in the development of future enterprises.

At present, the lack of integrated technology for power supply, charging and battery system application and related standards and specifications is still the main weak link in the promotion and application of electric vehicles, which brings great difficulties to the next development of electric vehicles and the unified planning of charging facilities. There is no mature product for the charging station monitoring system that can ensure the normal operation of large-scale charging stations. There is no unified standard for the communication protocol and communication interface between the charging station monitoring system and the charger, and there is no information connection between charging stations.

Commonly used charging modes of electric vehicles. According to the technology and usage characteristics of electric vehicle power battery packs, there are certain differences in the charging modes of electric vehicles. For the selection of charging schemes, there are currently three modes of household charging piles, public charging piles and battery replacement.

The first is a household charging pile. When buying an electric car, a home charging pile is generally given with the car, and technicians will be arranged to install and debug at the door. The charging time of this charging method is not bad, and it will vary with the brand and model of the vehicle, but the premise is There must be a parking space, and the property allows you to install household charging points in the parking space.

The second way is public charging piles. The advantage of this charging method is that you can choose between DC fast charging and AC slow charging according to the actual situation, and it is also the only place that supports DC fast charging, but the disadvantages are also obvious. Public charging piles are currently under construction and difficult to find. It is not easy to take up afterwards, and the charging cost is relatively high.

The third charging method is to change the battery. This is also the last trick for electric vehicles. Specially trained technicians can replace the battery within 2-10 minutes through fully automatic or semi-automatic technology to achieve electrical energy replenishment, so as to achieve a speed comparable to that of fuel vehicles. But this The shortcomings of this method are also obvious. It can only be operated by professionals in professional locations, and the replacement of batteries is uneven, which is worrying.

Generally speaking, the charging methods of electric vehicles are more flexible and diverse. You can choose the charging method scientifically and reasonably according to your actual situation. This can not only achieve the normal use of electric vehicles, but also save charging costs, and is economical.

The main factor affecting the safety of electric vehicles is the charging process of the battery. The inconsistency of battery technology is one of the basic characteristics shared by all types of batteries, which is mainly manifested in the capacity error, internal resistance error and voltage error of the battery. The consistency error of a few batteries is not obvious, but the capacity error, internal resistance error and voltage error of the electric vehicle battery pack composed of dozens or even hundreds of battery cells will become prominent. In the process of electric vehicle charging, it is impossible to sequentially charge the battery cells, but to charge the entire battery pack. During the charging process, due to the internal resistance error, the voltage at both ends of the battery cells in the entire battery pack forms an error. The larger the internal resistance error, the more obvious the voltage error formed. Although the charging voltage at both ends of the entire battery pack will not exceed the rated voltage, the voltage at both ends of an individual single battery may exceed its rated voltage, which may easily lead to unbalanced charging of the battery pack and different charging capacities of single batteries. If the voltage error of the battery is too large, it may exceed the safe capacity of battery charging, causing the battery to overheat and cause an accident. Therefore, the charging device for electric vehicles must have technical measures to prevent the battery system cell voltage and temperature from exceeding the allowable value to improve the safety of the electric vehicle charging process.

Electric vehicles can also make full use of the surplus electricity during the night when the electricity is low for charging, so that the power generation equipment can be fully utilized day and night, and its economic benefits are greatly improved. It is these advantages that make the research and application of electric vehicles a "hot spot" in the automotive industry.

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