

Discussion on the Application of New Energy Vehicles in Hybrid Electric Technology

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Abstract: With the more prominent environmental problems, in order to solve the automobile exhaust emissions and energy crisis, this paper takes hybrid technology as the entry point to discuss the application of new energy vehicles. By taking hybrid electric vehicles as an example, their advantages in environmental protection and fuel economy are studied, and some solutions such as intelligent energy management and diversified energy supply are proposed. The research results aim to provide reference for relevant personnel and projects, promote the further development of new energy hybrid vehicle technology, and contribute to sustainable travel and environmentally friendly transportation.

Keywords: Hybrid Power Technology; New Energy Vehicles; Environmental Protection; Fuel Economy

Introduction

In the context of increasing global attention to environmental issues, hybrid technology, as the forefront of innovation in the automotive industry, has triggered a wide range of discussion and application. The development of new energy vehicles is not only driven by environmental awareness, but also designed to solve the problems of traditional automobile exhaust emissions and energy sustainability. The emergence of hybrid technology is gradually changing the pattern of the automobile industry, providing a new solution to improving fuel economy, reducing exhaust emissions, and promoting intelligent energy management. In this context, the application of hybrid technology in new energy vehicles has become an important link to promote the development of sustainable transportation.

1. The necessity of developing new energy hybrid electric vehicle technology

By effectively integrating traditional fuel power and electric power, hybrid technology improves the utilization efficiency of automobile fuel, reduces the excessive dependence on traditional fossil energy, and effectively responds to the challenge of increasingly tight energy resources. Hybrid systems have the flexibility in energy conversion to achieve optimal performance under different driving conditions, thus reducing vehicle emissions and the impact on the environment. This technology not only helps to reduce greenhouse gas emissions and improve air quality, but also meets the growing global requirements for environmental protection. The marketing of hybrid electric vehicles can also stimulate the innovation of new energy technologies and promote the development of the automobile industry to a cleaner, more efficient and sustainable direction. The application of new energy hybrid electric vehicle technology is not only urgent in the aspect of energy utilization, but also has a positive role in promoting the realization of the sustainable development and environmental protection goals of the automobile industry.

2. The development status of new energy hybrid electric vehicle technology

2.1. Battery technology is constantly improving

With the continuous evolution of technology, battery technology in new energy hybrid vehicles is undergoing significant improvement. As a mainstream battery technology, lithium-ion battery has made great progress in high-energy density and rapid charging, and has become the core energy storage unit of new energy vehicles. The application of this battery technology not only improves the power performance of the car, but also enhances the range in electric mode, allowing drivers to enjoy a zero-emission driving experience for longer.

2.2. Application of intelligence and connectivity

Hybrid vehicles have made significant progress in intelligence and connectivity, revolutionizing the driving experience and energy management^[1]. Advanced intelligent energy management system can not only monitor the state and driving behavior of vehicles in real time,

but also conduct in-depth data analysis through advanced algorithms to optimize energy distribution, so as to maximize fuel utilization efficiency. This allows the hybrid system to automatically adjust itself in a variety of driving conditions, ensuring optimal performance at different speeds, road conditions, and driving modes.

2.3. Diversified Hybrid power system design

At present, the design of hybrid electric vehicles is undergoing significant changes, no longer limited by the traditional tandem structure. New energy hybrid electric vehicles show an obvious trend of diversification, including parallel and series and parallel hybrid power system and other innovative forms. The new parallel hybrid system allows the internal combustion engine and electric motor to drive the vehicle simultaneously or separately, enabling more flexible power distribution. At high speeds, the system provides strong power output, and in scenarios such as low-speed urban driving, it can switch to electric mode to optimize the fuel economy of the vehicle^[2]. The series and parallel hybrid power system organically integrates the series and parallel structures.

3. The development trend of new energy hybrid electric vehicle technology

3.1. Efficient energy management and intelligent control system

Advanced algorithms will become an important part of the efficient energy management systems in the future. By using technologies such as machine learning and artificial intelligence, the system can more accurately predict the driving modes and driving road conditions, and then optimize the operation strategy of the hybrid power system. This intelligent energy management system can adjust the proportion of fuel and electricity used in real time to adapt to different driving environments and improve the fuel efficiency of the vehicle. The application of advanced sensor technology will also play a key role in efficient energy management. Vehicles are equipped with sensors that can monitor vehicle status, driving behavior, and changes in the surrounding environment in real time, providing accurate input data for the energy management system. This helps the system to better understand the needs of the driver and make intelligent adjustments in time to maximize the performance and economy of hybrid vehicles. In terms of the collaborative work of hybrid power system, the future development will pay more attention to the intelligent collaboration of electric and traditional power^[3]. By adjusting the output power of the engine and the motor in real time, the system can achieve the best cooperative working mode in different driving scenarios, which not only improves the driving comfort and performance, but also hopes to extend the range in the electric mode.

3.2. A more lightweight structural design

The wide application of advanced materials is the core of lightweight design. High strength and low density new alloys, carbon fiber and other composites will replace traditional steel structures to achieve a lighter overall weight while maintaining the structural strength of the vehicle. This not only helps to improve the energy efficiency of the vehicle, but also provides a higher payload for the battery, further enhancing the range in electric mode. Structural optimization will be a key factor in the design process. By precisely analyzing the stress and load distribution in various parts of the vehicle, manufacturers can more efficiently design lightweight structures in order to meet safety and performance requirements. This involves the application of advanced computer-aided design (CAD) and simulation technology, enabling the vehicle to maintain superior stability and safety under different driving conditions. Manufacturing process innovation will also play a key role in lightweight design. Advanced manufacturing technologies, such as 3 D printing and modular assembly, will further simplify the production process and reduce the number of parts, thus reducing vehicle quality^[4]. This not only improves production efficiency, but also is expected to improve the overall quality level of the vehicle while reducing manufacturing costs.

3.3. Diversify the energy supply

Electricity as a main energy supply will continue to be valued. Electric drive systems, as the core of hybrid vehicles, will continue to rely on the continuous development of advanced battery technology and charging infrastructure. Through electric mode, cars can drive at zero emissions, meeting the growing demand for environmentally friendly and clean energy. Conventional fuel oil will still play an important role

in hybrid electric vehicles. The internal combustion engine is part of a hybrid system that can provide additional power support when needed, while acting as a backup energy source. This design allows hybrid vehicles to be flexible to various driving needs when not easily charged. Emerging hydrogen fuel cell technology will also be an important choice for future hybrid vehicles. Hydrogen fuel cells are highly efficient and have zero emissions, and can provide a longer range and achieve rapid charging during refueling. The introduction of this form of energy will further expand the application of hybrid vehicles, making them more suitable for long-distance driving and a wider range of uses. Biofuels and renewable energy will also gradually take a place in hybrid vehicles. By adopting sustainably produced biofuels, vehicles can reduce their reliance on limited natural resources, reduce their carbon footprint, and achieve a more environmentally friendly driving experience.

Conclusion: The development of hybrid technology marks an important step forward for the automotive industry to be more environmentally friendly and efficient. In the future, with the continuous evolution of technology, new energy vehicles will be more widely integrated into daily life and become the main force of sustainable transportation. The continuous improvement of intelligent energy management system will improve the efficiency of automobile energy utilization, and diversified energy supply will make the automobile more adapt to different needs. With technological innovation and the energy transition, hybrid technology is expected to be further optimized to push the automotive industry to a cleaner and smarter future. This trend will encourage manufacturers and researchers to continue to make greater contributions to the vision of zero-emission and efficient energy use.

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