[Design and development of self-heating and cooling materials in wiring harnesses]

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Abstract

The aim is to address common challenges such as heat buildup, moisture intrusion, and mechanical stress, which can lead to electrical failures and safety risks.

By using advanced materials we can reduce the risks and we can improve the safety of wiring harnesses in this modern technology

Background

Traditional wiring harnesses face challenges like heat buildup, moisture exposure, and mechanical stress, leading to potential electrical failures and safety risks.

To address these issues, our project explores advanced self-heating and cooling materials that regulate temperature and improve durability.

By integrating these materials, we aim to enhance the safety, reliability, and lifespan of wiring harnesses, particularly in demanding automotive environments.

Methods

Material Selection: We're likely looking at good thermal conductivity and insulation properties. Common materials may include thermal interface materials, and phase change materials, that can absorb, store, and release heat

Software Part: It provides real-time validation, ensuring that the wiring harness meets industry standards and the tool allows multiple team members to collaborate on the same project

Hardware Part: Physical testing setup is important and Prototyping, and measurement tools include details about the equipment.

Expected Outcome

Enhanced the thermal management in the Wiring harness

Improved safety, reliability, and efficiency of electrical systems in vehicles

Reduction of risks like electrical short circuits and fires

Conclusion

In this phase of the project, we proposed some materials. Moving forward, we will focus on integrating both software and hardware tools for detailed analysis and simulation

Future Perspectives

We have identified promising materials for self-heating and cooling wiring harnesses, addressing key challenges in automotive safety and reliability. Our next steps involve validating these materials through software simulations and hardware testing, which will pave the way for improved thermal management in wiring harness

Impact on Society

→Safer vehicles due to more reliable wiring systems

→ Lower maintenance and repair costs.

→Potential environmental benefits through increased energy and longevity of electrical systems