**Abstract**

This thesis presents a systematic literature review of fixed fire suppression systems and extinguishing agents for lithium-ion battery (LIB) fires. The review identifies 85 relevant sources published between 2013 and March 2023, and categorises different research experiments into cell-level, module-level, electric vehicle (EV) pack-level, battery energy storage system (BESS) rack-level and warehouse storage experiments, according to LIB configurations. It was found that about 67% of the publications focused on small-scale cell-level and 9% on module-level experiments. However, large-scale EV pack-level and BESS rack-level experiments are lacking. More than twenty (20) different extinguishing agents (water-based, gas-based, powder-based and novel combinations of agents) and two (2) dispersion modes (total flooding and direct internal injection) are evaluated systematically. The advantages and drawbacks of each type of extinguishing agent are compared and discussed based on dispersion modes and LIB configurations. Lastly, suggestions on how to apply the findings from the small-scale experiments onto large-scale experiments and key findings of potential applications of extinguishing agents in EV and BESS are presented.

**Translation in Author’s Mother Tongue (Chinese)**

**摘要**

本文系统地对锂电池相关火灾固定抑制系统和灭火剂的文献进行了综述。该综述包含了2013年至2023年3月间发表的85个相关文献，并根据锂电池的不同配置将收集到的研究实验分为单体级、模块级、电动汽车包级、电池储能系统机架级和仓储实验。发现约67%的文献集中在小尺度单体级实验上，而仅有9%的文献集中在模块级实验上。然而，大规模的电动汽车包级和电池储能系统机架级实验还明显不足。本文系统地评估了20多种灭火剂（水基、气体、粉末和新型组合灭火剂）和2种应用方式（全面覆盖和直接内部喷射）。根据应用方式和电池配置的不同，比较和讨论了每种灭火剂的优缺点。最后，提出了如何将小尺度实验的研究成果应用于大规模实验的一些建议以及总结了灭火剂在电动汽车和电池储能系统中潜在应用的关键发现。