

实验室锂电池安全 应急准备与响应指引



NO. 021

锂电池安全应急准备

- 锂电池储存能量，电池内部的化学反应过程使得化学能转化为电能，并通过电解质的作用实现了电子和离子的传导。当有**过放、过充、外短路、挤压、跌落**等操作不当的行为时，就有可能导致锂电池**冒烟或起火**。因此当实验室内存放、使用锂电池时，应掌握并遵守锂电池安全使用管理的要求，提前学习其灭火方法，备好应急物资，做好应急准备。
- 锂电池充放电前必须检查电池是否有**损伤、变形、漏液、鼓包**等问题。如有，则不得进行充放电作业。
- 选择具备**短路保护、过流保护、过放保护、超温保护功能**等安全要求的充电器，锂电池充放电时，应有专人值守。
- 锂电池存储和使用时应遵守制造商说明，**避免电极短路，避免机械损伤，避免长期直接暴露于高温或热源（包括阳光直射）**。建议将锂电池存放在金属柜内，放在吸塑包装盒（或同类绝缘材料）内，并将电极片用绝缘胶布包裹。
- 锂电池存放点附近，应配备**耐高温手套、长柄夹、消防沙桶、水桶**等应急物资。



锂电池存放柜

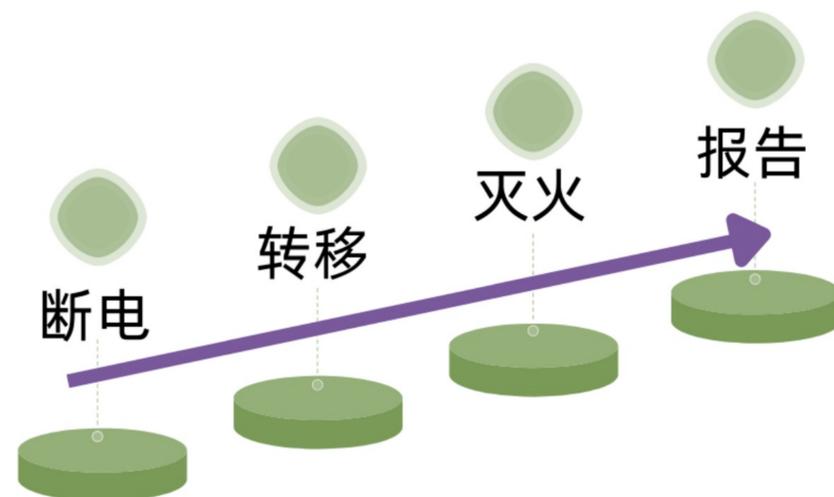


应急物资配备



长柄夹

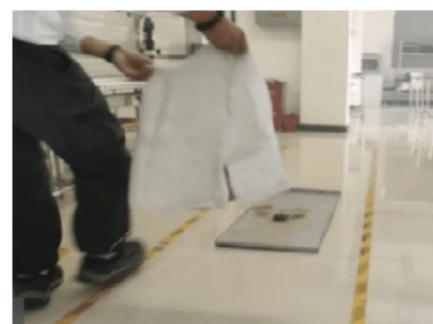
锂电池事故应急响应



- 如火势过大，应首先确保人身安全，进行紧急撤离并报告。
- 如在充电或在设备中电池出现冒烟或起火，应先将**设备断电**。
- 如果电池只是冒烟，可利用现场配置的**耐高温手套**或**长柄夹**转移事故电池至现场配置的**消防沙桶**或**水桶**内。
- 如果电池起火，可利用实验室现场配置的**消防沙、灭火毯、二氧化碳灭火器**对着火的电池进行灭火（如下图）。
- 灭火完毕后使用**耐高温手套**或**长柄夹**将事故电池放置在**消防沙桶**或**水桶**内。
- 处置完毕后，应立即报告。



用消防沙覆盖住着火电池



用灭火毯覆盖住着火电池

用CO₂灭火器灭火

Laboratory Lithium-ion Battery Safety and Emergency Preparedness and Response Guidelines



NO. 021

Emergency Preparedness

- Lithium-ion batteries store energy. When there is an **over-discharge**, **over-charge**, **external short circuit**, **squeezing**, **dropping** and other improper operation behaviors, it may cause the lithium-ion battery to **smoke** or **caught fire**. Therefore, when storing and using lithium-ion batteries in the laboratory, we should know fire extinguishing methods in advance, prepare emergency supplies, and make emergency preparations.
- Before charging and discharging, the lithium-ion battery must be checked for **damage**, **deformation**, **leakage**, **bulging** and other problems. If there is, the charging and discharging operation shall not be carried out.
- Choose a charger which meets safety requirements such as **short-circuit protection**, **over-current protection**, **over-discharge protection**, and **over-temperature protection**, and there should be dedicated personnel on duty when charging and discharging.
- Lithium-ion batteries should be stored and used in accordance with the manufacturer's instructions, **avoid short circuits in the electrodes**, **avoid mechanical damage**, and **avoid long-term direct exposure to high temperatures or heat sources (including direct sunlight)**. It is recommended to store the lithium-ion battery in a metal cabinet, in a blister box (or similar insulating material), and wrap the electrode sheet with insulating tape.
- Near the lithium-ion battery storage point, emergency supplies such as **heat-resistant gloves**, **long-handle clips**, **fire sand buckets** or **water buckets** should be equipped.



Lithium-ion batteries storage cabinet



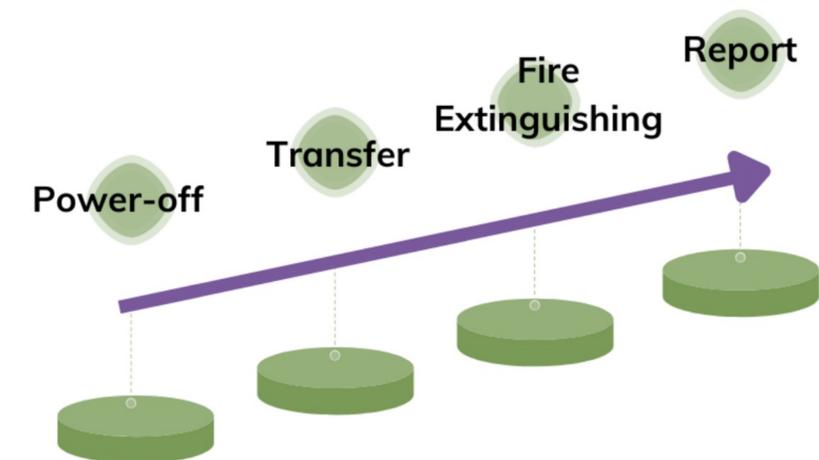
Emergency supplier



Long-handled clips



Emergency Response



- In case of a large fire, prioritize personal safety, evacuate immediately and report.
- If smoke or flames coming from the lithium-ion battery while charging or inside the device, **disconnect the power supply** first.
- If the battery is just smoking, it can be transferred to the **fire sand bucket** or **water bucket** using **heat-resistant gloves** or **long-handled clips**.
- If a battery catches fire, you can use **fire sand**, **fire blankets**, and **carbon dioxide fire extinguishers** to extinguish the burning battery (as shown in the figure below).
- After extinguishing the fire, use **heat-resistant gloves** or **long-handled clips** to place the incident battery in a **fire sand bucket** or **water bucket**.
- An immediate report should be made after disposal.



Cover the burning battery with fire sand



Cover the burning battery with fire blanket

Extinguish the burning battery with CO₂ fire extinguisher