



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

LITHIUM-ION BATTERY EMERGENCIES

Cody Clem
Captain Paramedic
Hazardous Materials Specialist
Contra Costa County Fire Protection District

Service • Leadership • Teamwork • Safety and Preparedness • Professionalism • Integrity



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT FIRE • RESCUE • EMS

MEETING OBJECTIVES

This presentation will be a brief introduction about the growing risks linked to lithium-ion battery fires. I will briefly describe incidents from around the state of California as well as incidents that have happened in Contra Costa County. Concluding with the Take Charge campaign which is the focus of Fire Prevention Month 2025.



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

EVERYDAY LITHIUM-ION BATTERY USE



This Photo by Unknown Author is licensed under [CC BY-SA-NC](#)



This Photo by Unknown Author is licensed under [CC BY-SA](#)

Service • Leadership • Teamwork • Safety and Preparedness • Professionalism • Integrity



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

EVERYDAY LITHIUM-ION BATTERY USE



Service • Leadership • Teamwork • Safety and Preparedness • Professionalism • Integrity



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

EVERYDAY LITHIUM-ION BATTERY USE



Service • Leadership • Teamwork • Safety and Preparedness • Professionalism • Integrity



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

EVERYDAY USE = EVERYDAY PROBLEMS



Tesla Fire Hunsaker Canyon



2 critically injured in two-alarm
Pittsburg apartment fire



“Contra Costa Fire officials warn of lithium ion
battery dangers after series of related fires.”



Service • Leadership • Teamwork • Safety and Preparedness • Professionalism • Integrity



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

CYLINDRICAL CELLS



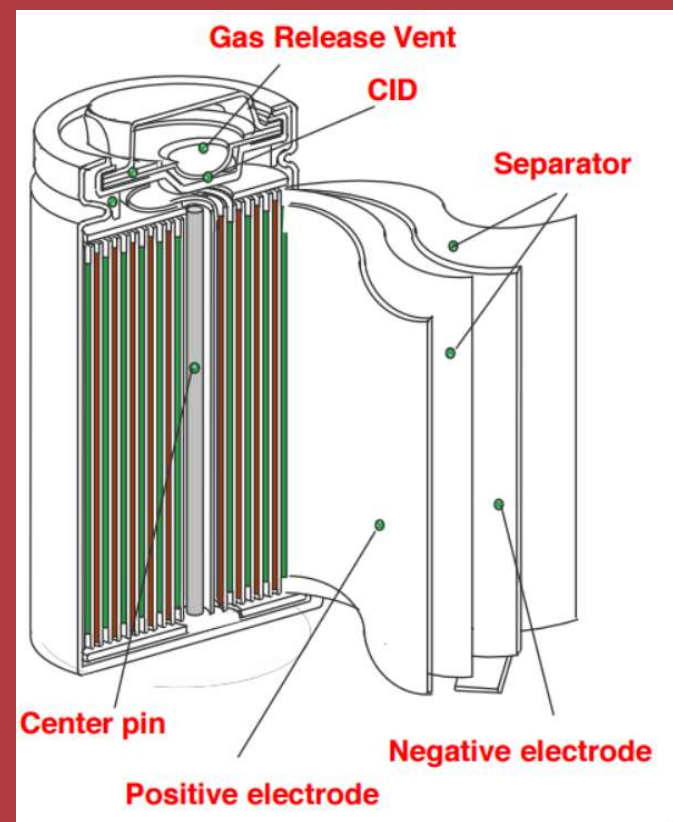
Cylindrical cells are commonly used in everything from vape pens, micro mobility devices like scooters and bikes, to commercial busses, trucks, and storage systems. One 18650 lithium-ion battery can produce eight liters of toxic/flammable gas. Many devices use several 18650 cells to work. In the case of a typical electric bike/scooter, the battery may contain between 50 and 130 cells. Some Tesla models have more than 7,000 cells.



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT FIRE • RESCUE • EMS

CHEMICAL COMPOSITION

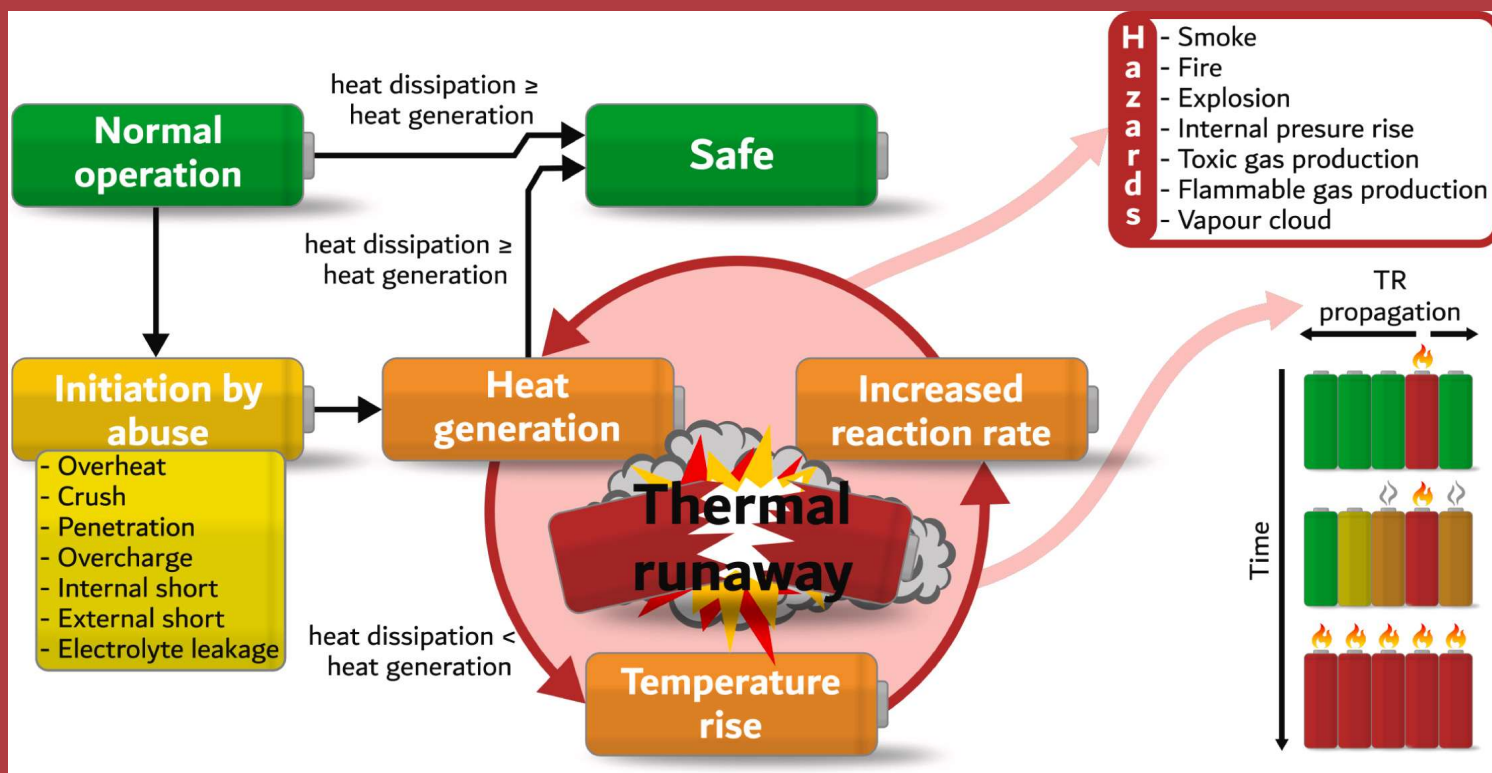
- The chemistry for lithium-ion batteries are numerous but the design is mostly the same. The most common ones in use are nickel manganese cobalt (NMC), nickel cobalt aluminum (NCA), and lithium iron phosphate (LFP) or (LiFePO_4). Each chemistry has a specific strength of application.





CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT FIRE • RESCUE • EMS

PROCESS OF THERMAL RUNAWAY





CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

WHAT TYPE OF GASSES?

- **Flammable**

- Carbon Monoxide
- Hydrogen
- Various Hydrocarbons
- Methane
- Ethane
- Ethylene
- Etc..

- **Toxic**

- Carbon Dioxide
- Hydrogen Fluoride
- Hydrogen Cyanide
- Hydrogen Chloride
- Nitrogen Dioxide
- Sulfur Dioxide
- Carbonyl Fluoride
- Phosphoryl Fluoride



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

METAL PARTICULATE MATTER

- 12,000 – 17,000 times the EPA ambient standard for particulate matter
- Lithium
- Nickel
- Cobalt
- Manganese
- Copper



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

BATTERY ENERGY STORAGE SYSTEMS

- Diablo Energy Storage 200Mw of energy.
- 1 Megawatt = 1,000 Kilowatts
- Average home uses 800-1000Kw a month.
- Multiple smaller systems have been installed in the county.

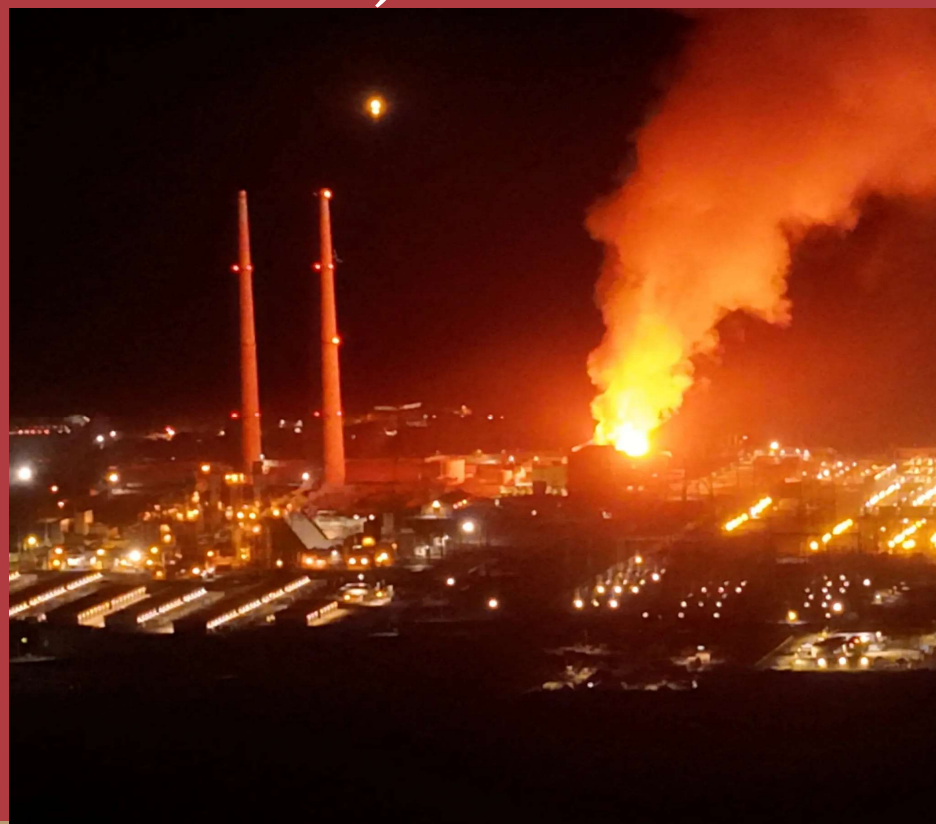




CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

MOSS LANDING (MONTEREY CO)

- PG&E Energy Storage Facility
- Was not the first fire at this location (2021 & 2022)
- Evacuations of 1,700 people
- EPA utilized for air monitoring surveillance
- Initial concern is of HF but has evolved into long term effects of heavy metals







The National



2018/07/29 17:31:54

51





INDEPENDENT



CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT
FIRE • RESCUE • EMS

OTAY MESA INCIDENT (SAN DIEGO CO.)

- Fire occurred in May of 2024
- Burned for over a week.
- Clean up is still on going at the site. Expected completion late 2025
- EPA utilized for air monitoring surveillance and water monitoring operations





CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT FIRE • RESCUE • EMS

SEASIDE INCIDENT (LOS ANGELES)

- BESS during transport fell off truck.
- Mechanical / Physical Damage cause Thermal Runaway.
- Shut down major freeway for nearly 48 hours.
- Projected \$900,000,000 in Port revenue loss
- 6 Firefighters injured
- EPA utilized for air monitoring surveillance







CONTRA COSTA COUNTY FIRE PROTECTION DISTRICT FIRE • RESCUE • EMS

- C – Choose certified products
- H – Handle with care
- A – Always stay alert for warning signs
- R – Recycle batteries and devices properly
- G – Get out quickly if there's a fire
- E – Educate others about battery safety

TAKE CHARGE
OF BATTERY SAFETY

