Statistics and Analysis on fire accidents for EVs

China
2018.09
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Statistics of EVs fire accidents

Period: 2011.02-2018.06
Range: all drive types, and nearly all manufactures
Source: Statistical information comes from online reports
Accident cause: over charge, crash, spontaneous combustion, water immersion, and others

- Over charge: 26.2%
- Crash: 36.9%
- Spontaneous combustion: 9.2%
- Water immersion: 4.6%
- Mechanical damage: 23.1%
- Others: 26.2%
Typical EVs fire accidents

Cause: over charge
Data: 26-04-2015
Location: Shenzhen, China
Vehicle: BEV bus
Battery: LFP

Energy charged: 202 kWh (rated energy is 324 kWh)
Typical EVs fire accidents

Cause: crash
Data: 26-05-2012
Location: Shenzhen, China
Vehicle: BEV
Battery: LFP
Accident:
An EV taxi was seriously hit by a sports car, and the taxi caught fire, resulting in the death of 3 persons in the taxi
Description:
After the severe collision, the rear part of the vehicle body and the battery were deformed, resulting in damage and short circuit of some batteries. The short circuit formed between the high-voltage line and the vehicle body generated an electric arc, which ignited combustible materials and some batteries. There was no explosion phenomenon.
Typical EVs fire accidents

Cause: immersion
Data: 07-07-2016
Location: Nanjing, China
Vehicle: BEV bus
Accident:
In July 2016, two BEV buses were flooded due to heavy rain in Nanjing. After the rainwater receded, the vehicle was involved in a fire accident.
Typical EVs fire accidents

Cause: spontaneous combustion
Location: China
Vehicle: BEV

The fire position is in the bottom of the car from the battery. According to reports, the car was parked when spontaneous combustion happened.

Anhui Aug. 2018
A EV bus suddenly could not move, and the driver cut off the power to evacuate the passengers. After a few minutes, the bus began to smoke, and the automatic fire extinguishing device started to extinguish the fire. It is reported that only the battery is partially damaged.

Beijing Jun. 2018
The car was parked when spontaneous combustion happened. The battery at the bottom of the vehicle burns violently.
## Accidents causes and suggestions

<table>
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<th>N.O</th>
<th>CAUSE OF ACCIDENTS</th>
<th>SUGGESTIONS</th>
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</table>
| 1   | Charge and overcharge           | 1. Overcharge test  
|     |                                  | 2. Low temperature charge test  
|     |                                  | 3. High temperature charge test  
|     |                                  | 4. Thermal propagation test                                                   |
| 2   | Crash                           | 1. Crush test  
|     |                                  | 2. Inertial load at vehicle crash for packs/systems  
|     |                                  | 3. Other critical test, such as dynamic crash test  
|     |                                  | 4. Thermal propagation test                                                   |
| 3   | Water immersion                 | 1. Water immersion test  
|     |                                  | 2. IP test                                                                   |
|     |                                  | 3. Water immersion test after reliability test (vibration, thermal shock, etc.) |
| 4   | Spontaneous combustion          | 1. Thermal propagation test                                                 |
Thanks for your attention!