

Thermal Event Destroys an Apple Notebook

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A Cornell student had their 2013 15” MacBook Pro battery rupture in mid-June. It was in a backpack that started to “smoke” during a class. Fire personnel and Police were called in and fortunately, the laptop did not catch fire; only one battery cell was involved.

Laptop and phone batteries (or any lithium ion battery), under some very unusual circumstances, can begin to swell. Swelling can cause a rupture which leads to what Apple refers to as a “thermal event”. Batteries expand when gas builds up inside of the battery cell. Over charging from a faulty charger, extreme heat, and a manufacturer fault in the battery can cause swelling to occur. In this case, one battery cell expanded to the point of rupture causing smoking and extreme heat. In some cases, this can cause a fire. This is one of the first such situations we’ve seen at The Computing Center.

Once we got the machine into our shop, we were able to determine that only one of the six battery cells in this model had ruptured. The remaining cells were, thankfully, unharmed and stable. In a stroke of luck, we were able to recover most of the data contained on the Solid State Drive (SSD). At the bottom of this article is some of the details regarding this event.

- **How do you keep this from happening to your laptop or phone?**

- Do not expose your devices to temperature extremes. Exposure to extreme heat can cause a battery to swell.

- Just like a pet or person, DON’T leave your laptop or phone in a hot car.

- Power down your laptop before you place it into a bag. If the computer is on and hot from regular use, placing it into an enclosed area where the heat cannot escape could lead to overheating.

- Be on the lookout for bulges, charging problems, or other issues with your devices, especially if they are several years old.

- If your laptop or phone has any kind of discernible bulge to the case, the battery could be failing. If the device won’t stay charged or stops working, but then appears to work OK with the AC adapter, it’s time to get the batteries looked at.

- With Apple laptops, if the trackpad stops working correctly, a bulging battery could be causing the problem.

- Use the correct charger. Some “off brand” chargers overcharge the battery - particularly on phones. If your device gets hot and stays hot while charging, your charger may be bad.

What to do if your device starts smoking?

- Call Fire or Police. As you can see from the photos below, a battery fire can get VERY hot.

- Get it out of any backpack, case, or sleeve. If possible, get the device away from anything else flammable.

- If sand is available, burying the laptop or phone in clean sand can be effective.

- A dry-chemical extinguisher can be effective in reducing the temperature, but it likely won’t completely extinguish a fire.

- **Here are the Don’ts!**

- DON'T ever use water or other liquid to try to extinguish a smoking device.
- DON'T try to smash the device to try and remove the battery.

easily
-Laptops often have more than one battery cell. Trying to smash it could
rupture another battery.
- DON'T breathe any of the fumes.

Bottom line: With any device that has a battery, if something unusual is happening, don't ignore it. Get to our shop or other reputable dealer.

Don't delay.

The author is one of The Computing Center's Apple Certified Mac Technicians (ACMT). We provide warranty and non-warranty repair and support for all Apple Macintosh products.

Photos

The Interior of the Computer:



This is a view of the interior components of the computer with the bottom case removed. The cell that was ruptured is visible on the left as well as the 5 other battery cells contained within the computer. You can also see melting around the ruptured cell where the heat from the thermal event melted other components on the computer. On the right, the bottom case shows scorch marks and heat damage. Not visible in this photo is the other side of the bottom case where the laptop rested against the backpack. The thermal event melted the backpack and the melted material stuck to the bottom case.

The Solid State Drive (in the adapter) vs. an undamaged SSD:



Even though the SSD was right next to the ruptured cell and got very hot, we were able to recover most of the data from it!