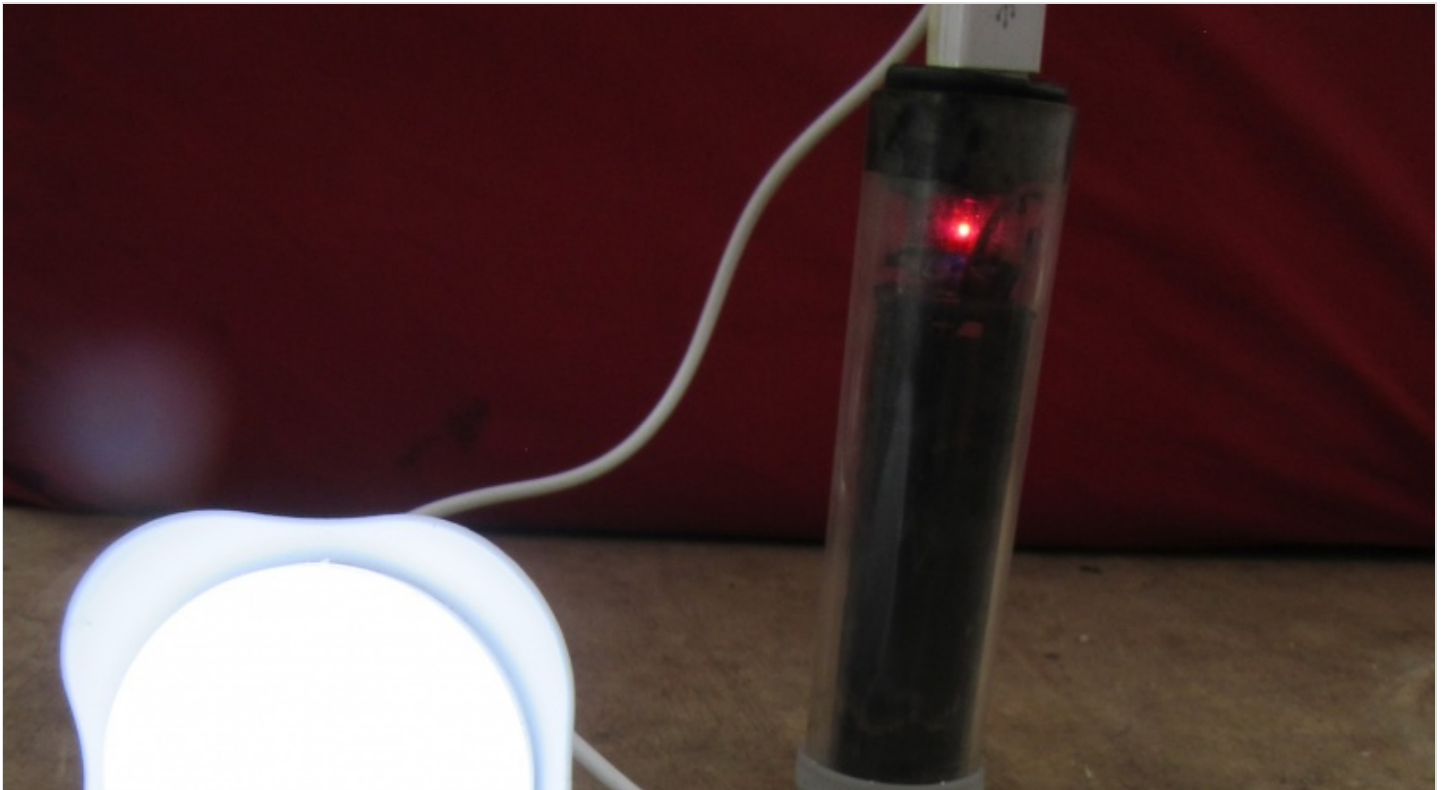



# Simple powerbank

 Nomade des Mers




[https://wiki.lowtechlab.org/wiki/Powerbank\\_simple/en](https://wiki.lowtechlab.org/wiki/Powerbank_simple/en)

Dernière modification le 22/10/2019

 Difficulté Facile

 Durée 1 heure(s)

 Coût 5 EUR (€)

## Description

Powerbank / single external battery for small independent lighting or smartphone charging.

# Sommaire

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Description

Sommaire

Introduction

Étape 1 - Selection of lithium-ion cells

Étape 2 - Assembly of components.

Étape 3 - Put in the container.

Étape 4 - Use

Notes et références

Commentaires

# Introduction

This tutorial presents the manufacture of a very simple powerbank allowing the feeding of a small lighting or the charging of a smartphone via a USB socket. It is made from lithium-ion cells recovered from used laptop batteries.

## Safety :

Lithium-ion batteries can be particularly dangerous. Their charges and discharges must be protected with a suitable electronic circuit. In addition, short circuiting a cell can cause it to explode: It is therefore imperative to handle them with care: gloves and goggles.

## Laptop batteries:

Removable computer batteries are mostly made up of lithium-ion cells in series or parallel with an input charge / discharge regulator. When a battery is faulty, it is very likely that only one of the cells or even just the regulator fails. It is still possible to reuse the others.

## Why reuse this type of cells / batteries?

- Storage: This type of technology is currently one of the lightest compared to the amount of energy it can store.
- Environment: 1300T of accumulators are thrown away each year with a forecast at 14000T for 2020. Depending on the country, they end up either in nature, rejecting toxic substances, or part of them for energy-consuming recycling. However, many of the cells are potentially usable as is for a new life.
- Economy: Small local economies can arise from the reuse of lithium-ion cells still usable, for the production of lamps, powerbanks, etc.

## Technical data :

The realization of a powerbank from lithium-ion cells requires cell recovery as well as the acquisition of an electronic module charge / discharge. 2 options are available later:

The simplest option (explained in this tutorial) is the use of a single lithium-ion cell. This option requires only to validate the proper functioning of the cell by a voltage test.

The second option is to couple several cells together according to their load capacity. This requires more complex manipulation available ici.

## Matériaux

- A used laptop battery.
- A "lithium-ion battery holder", if possible with wire.
- A load / unload module.
- Tin wire.
- A container for the components: here plastic tube / inner tube and bottle cap.

## Outils

- Gloves and goggles.
- Chisel / hammer
- Wire stripper.
- Soldering iron.

**Note:** Safety equipment is to be worn throughout the realization.

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## Étape 1 - Selection of lithium-ion cells

- Open the computer battery, possibly using the chisel and hammer, while remaining delicate so as not to damage the cells.
- Separate the cells.

**Note:** As a safety measure, pay particular attention to the fact that the "+" and "-" of cells never come into contact.

- Using a voltmeter measure the voltage across each cell and keep only those above 2.5V.

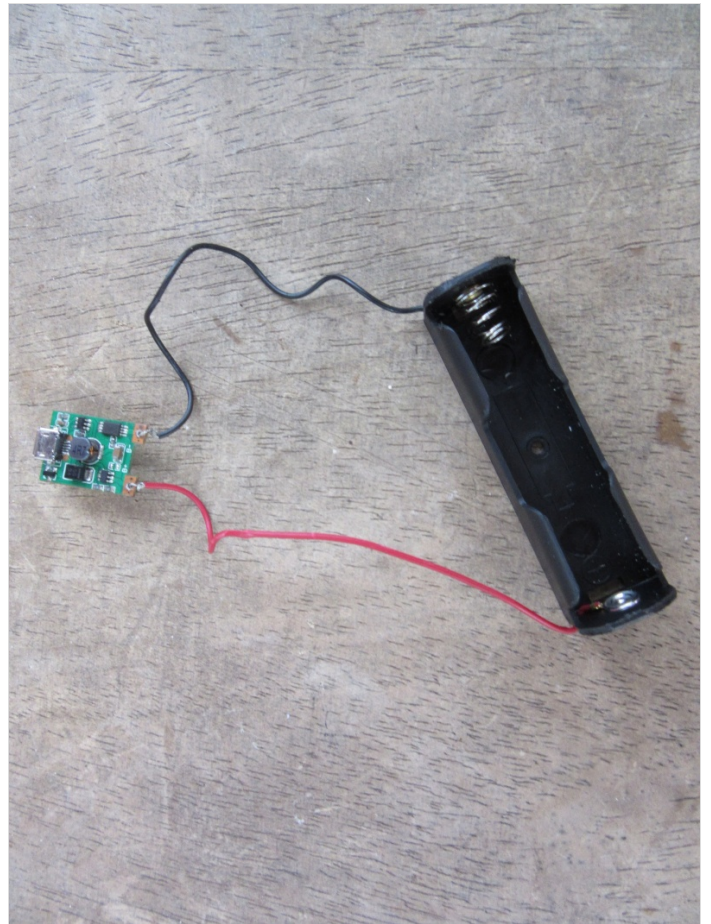
## Notes:

- 1) The + of the cell is located on the side of the groove on the cell.
- 2) The minimum voltage reached by a discharged lithium-ion cell is 2.5V. If the voltage is lower, it can go to recycling.



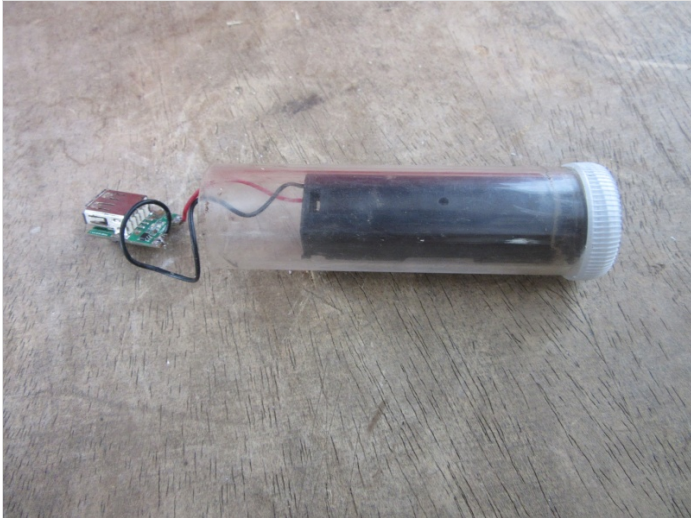
## Étape 2 - Assembly of components.

- Weld the - of lithium-ion battery holder to + of the charge / discharge module.
- Proceed in the same way for the -.
- Insert the cell in the "lithium-ion battery holder", respecting the '+' and '-' polarity (at risk of explosion of the cell).
- Test the charge and discharge of the cell via usb / mini USB cables: a color code of blue LED (charged) and red (discharged) on the load module allows to know the state of the cell.



## Étape 3 - Put in the container.

- Insert the assembly into the chosen container.



## Étape 4 - Use

- The powerbank can be used in addition to a smartphone battery to double the battery life.
- It can also be used for autonomous lighting. A test carried out with a bulb LED lamp allowed a lighting during 7h. (Power of the lamp to come).



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## Notes et références

- Tutorial directed by Arnaud Mayaux and Pierre-Alain Lévêque for Nomade des Mers, November 2017.
- Lithium-ion, wikipedia
- Recycling battery, wikipedia
- ARTE Future on lithium
- Informations on lithium-ion cells, frandroid
- Caractéristiques of lithium-ion cells, puissanceled