

Carbon Oxygen Battery

There's an article on [electrek](#) today about a company called [Noon Energy](#) who secured funding to commercialize Carbon Oxygen batteries. According to the article, compared to lithium-ion batteries, carbon oxygen batteries would:

- require only 1% of the critical elements
- cost about 10%
- have three times the energy density

There's not a lot of technical information, but I found [this description](#) from 2021:

It stores energy by splitting CO₂ into solid carbon and oxygen in a flow battery configuration, utilizing abundant materials and simple reaction chemistry.

And from this [patent application](#):

Unlike typical battery technology, where the energy is stored in the bonds of metal atoms which are stored on the electrodes of the battery cells, the invention provides an electrochemical device where electrical energy is converted and stored in the chemical bonds of carbon and oxygen molecules which are stored in reservoirs.

This has several advantages as expensive metal atoms are only used to catalyse the carbon-oxygen reactions and not for storing energy. Indeed a much lower quantity of expensive material is used to store energy in the carbon-oxygen battery than the quantity used in typical batteries.

By storing energy in carbon and oxygen molecules, a rechargeable battery having a maximum theoretical efficiency of 100%, an expected efficiency of 80-95% and a high energy density, such as between 900-4200 Wh/L depending on the pressure, i.e. between 1-100 bars, is produced. Thus, one of the great advantages of the invention is the ability to store electrical energy with high efficiency and energy density when the electricity supply does not match the electricity demand.