Claims:

1. A battery comprising:

a plurality of connected cells;

a power conditioning circuit coupled to the plurality of connected cells,

wherein the power conditioning circuit is operable to discharge the plurality of connected cells in a first range, the first range defined as a difference between an upper per cell voltage to a lower per cell voltage,

wherein the power conditioning circuit is operable to condition power discharged from the plurality of connected cells to provide an output voltage in a second range, wherein the second range is smaller than the first range on a per cell basis; and

output terminals electrically connected to the power conditioning circuit for providing the output voltage to a load.

2. The battery of claim 1, wherein the first range is greater than or equal to 1.8V per cell and optionally for the first range:

(i) the upper per cell voltage is 2.7V or more per cell and/or the lower per cell voltage is 0.7V or less per cell; or

(ii) the upper per cell voltage is 3.0V or more per cell and/or the lower per cell voltage is 0.5V or less per cell.

3. The battery of claim 1 or 2, wherein the second range is less than or equal to 1V per cell, wherein the output voltage in the second range is the difference between an upper per cell voltage output from the power conditioning circuit and a lower per cell voltage output from the power conditioning circuit, and optionally wherein the upper per cell voltage is 4.5V or less per cell and/or the lower per cell voltage is 2.7V or more per cell.

4. The battery of claim 3, wherein the upper per cell voltage output from the power conditioning circuit is 4.2V or less per cell and/or the lower per cell voltage output from the power conditioning circuit is 3.0V or more per cell.

5. The battery of any of claims 1 to 4, wherein the power conditioning circuit is:

(i) operable to discharge each cell of the plurality of connected cells from the upper per cell voltage of 3.3V per cell to the lower per cell voltage of 0.5V per cell; or

(ii) operable to discharge each cell of the plurality of connected cells from the upper per cell voltage of 3.7V per cell to the lower per cell voltage of 0.5V per cell.

6. The battery of any of claims 1 to 5, wherein the power conditioning circuit is:

(i) operable to increase the output voltage provided to the load while discharging the plurality of connected cells when a per cell voltage of the plurality of connected cells is less than a first threshold voltage; and/or

(ii) operable to decrease the output voltage provided to the load when a per cell voltage of the plurality of connected cells is greater than a second threshold voltage.

7. The battery of claim 6, wherein the power conditioning circuit is in a non-conditioning mode when the per cell voltage of the plurality of connected cells is between the first threshold voltage and the second threshold voltage.

8. The battery of claims 6 or 7, wherein the first threshold voltage is from 1.5 to 2V, preferably from 1.6 to 1.9V, more preferably 1.7 to 1.8V, and/or wherein the second threshold voltage is from 2.5 to 3V, preferably from 2.6 to 2.9V, more preferably from 2.7 to 2.8V.

9. The battery of any of claims 1 to 8, wherein each cell of the plurality of cells comprises a niobium oxide material as an electrode active material, optionally wherein the niobium oxide material is the anode during discharge of the cell.

10. The battery of claim 9, wherein the niobium oxide material is selected from a niobium oxide, a niobium metal oxide, a niobium metalloid oxide, a niobium phosphorous oxide, a niobium chalcogenide and combinations thereof, preferably a niobium oxide, a niobium metal oxide and combinations thereof, more preferably a niobium metal oxide and combinations thereof, optionally wherein the niobium oxide material is a niobium metal oxide selected from $Nb_{16}W_5O_{55}$, $Nb_{18}W_{16}O_{93}$ and combinations thereof.

11. The battery of any of claims 1 to 10, wherein the power conditioning circuit comprises a buck converter and the buck converter is operable to decrease the output per cell voltage to the load compared to the per cell voltage of the plurality of connected cells.

12. The battery of any of claims 1 to 11, wherein the power conditioning circuit comprises a boost converter and the boost converter is operable to increase the output per cell voltage to the load compared to the per cell voltage of the plurality of connected cells.

13. The battery of claim 12, wherein the boost converter is a dual-stage boost converter, the dual-stage boost converter comprising:

a controller; and

a first boost converter and a second boost converter that are coupled to the plurality of connected cells and are in parallel to each other, wherein the first boost converter and the second boost converter are operably coupled to the controller,

wherein the first boost converter is configured to generate a power signal to operate the second boost converter,

wherein the second boost converter is configured to boost an input voltage from the power source to provide an output voltage to a load when the second boost converter receives the power signal from the first boost converter.

14. The battery of claim 13, wherein the first boost converter is configured to generate the power signal to operate the second boost converter when the input voltage of the plurality of connected cells is between an upper per cell voltage and a lower per cell voltage.

15. The battery of claim 14, wherein:

(i) the upper per cell voltage is at least 2.7V per cell and the lower per cell voltage is 0.5V to 0.7V per cell;

(ii) the upper per cell voltage is at least 3.3V per cell and the lower per cell voltage is 0.5V to 0.7V per cell; or

(iii) the upper per cell voltage is at least 3.7V per cell and the lower per cell voltage is 0.5V to 0.7V per cell.

16. A method of discharging a battery, the method comprising:

discharging, using a power conditioning circuit, a plurality of connected cells in a first range, the first range defined as a difference between an upper per cell voltage to a lower per cell voltage;

conditioning power discharged from the plurality of connected cells to provide an output voltage in a second range, wherein the second range is smaller than the first range on a per cell basis; and

outputting the output voltage to a load.

17. The method of claim 16, wherein the first range is greater than or equal to 1.8V per cell and optionally for the first range:

(i) the upper per cell voltage is 2.7V or more per cell and/or the lower per cell voltage is 0.7V or less per cell; or

(ii) the upper per cell voltage is 3.0V or more per cell and/or the lower per cell voltage is 0.5V or less per cell.

18. The method of claim 16 or 17, wherein the second range is less than or equal to 1V per cell, wherein the second range is defined as a difference between an upper per cell voltage provided to the load and a lower per cell voltage provided to the load, optionally wherein the upper per cell voltage provided to the load is 4.5V or less per cell and/or the lower per cell voltage provided to the load is 2.7V or more per cell.

19. The method of any of claims 16 to 18, further comprising:

(i) discharging each cell of the plurality of connected cells from the upper per cell voltage of 3.3V per cell to the lower per cell voltage of 0.5V per cell; or

(ii) discharging each cell of the plurality of connected cells from the upper per cell voltage of 3.7V per cell to the lower per cell voltage of 0.5V per cell.

20. The method of any of claims 16 to 19, wherein conditioning the power comprises:

(i) increasing the output voltage provided to the load while discharging the plurality of connected cells when a per cell voltage of the plurality of connected cells is less than a first threshold voltage; and/or

(ii) decreasing the output voltage provided to the load when a per cell voltage of the plurality of connected cells is greater than a second threshold voltage.

21. The method of claim 20, further comprising operating the power conditioning circuit in a non-conditioning mode when the per cell voltage of the plurality of connected cells is between the first threshold voltage and the second threshold voltage.

22. The method of claim 20 or 21, wherein the first threshold voltage is from 1.5 to 2V, preferably from 1.6 to 1.9V, more preferably 1.7 to 1.8V, and/or wherein the second threshold voltage is from 2.5 to 3V, preferably from 2.6 to 2.9V, more preferably from 2.7 to 2.8V.

23. The method of any of claims 16 to 22, wherein each cell of the plurality of cells comprises a negative active material comprising a niobium oxide, a niobium metal oxide, or a combination thereof.