

CLAIMS

What is claimed is:

1. A method for managing a power supplying device on a blockchain-based system, the method comprising:

- (a) inputting a user identification, an existing product identification and a data retrieval instruction to a middleware computer;
- (b) verifying the user identification via the middleware computer;
- (c) retrieving, from existing blocks in a blockchain ledger, one or more virtual folders that are associated with the product identification;
- (d) transmitting the one or more virtual folders to the middleware computer;
- (e) extracting recorded characteristic data from the one or more virtual folders using the middleware computer;
- (f) verifying the recorded characteristic data;
- (g) inputting new characteristic data into the middleware computer;
- (h) generating, via the middleware computer, a new product identification that is connected to the existing product identification;
- (i) linking, via the middleware computer, the new product identification and the new characteristic data to form a new virtual folder;
- (j) transmitting the new virtual folder from the middleware computer to the blockchain ledger; and
- (k) creating a new block in the blockchain ledger to record the new virtual folder.

2. The method of claim 1, wherein the user identification comprises a user classification and the one or more virtual folders retrieved in step (c) are further associated with the user classification.

3. The method of claim 2, wherein step (b) further comprises determining access restrictions of the user classification, and the one or more virtual folders of step (c) are associated with the user classification by virtue of the one or more virtual folders being accessible under the access restrictions of the user classification.

4. The method of claim 1, wherein step (f) is performed by the middleware computer, and the new virtual folder of step (i) is formed by further linking the new product identification and the new characteristic data with the user identification.

5. The method of claim 1, wherein the new product identification of step (h) is further connected to one or both of the user identification and the new characteristic data.

6. The method of claim 1, wherein each of the recorded characteristic data and the new characteristic data independently comprise a product source, a product brand, a product type, a product size or combinations thereof.

7. The method of claim 1, wherein step (f) further comprises producing a verification result, transmitting the verification result from the middleware computer to the blockchain ledger and recording the verification result in the blockchain ledger.

8. The method of claim 7, wherein step (f) further comprises issuing a reward once the verification result is recorded in the blockchain ledger.

9. The method of claim 1, wherein step (k) further comprises issuing a reward once the new virtual folder is recorded in the blockchain ledger.

10. A blockchain-based tracking system for managing a power supplying device, comprising:

a blockchain, and

one or more middleware computers that are capable of:

receiving one or more virtual folders from a blockchain;

extracting recorded characteristic data from the one or more virtual folders;

verifying a user identification and the recorded characteristic data;

generating a new product identification that is connected to an existing product identification;

linking the new product identification and new characteristic data to form a new virtual folder;

transmitting the new virtual folder to the blockchain; and

creating a new block in the blockchain to record the new virtual folder.

11. The system of claim 10, wherein the one or more middleware computers are accessible by a plurality of users, with each user belonging to a sector.

12. The system of claim 11, wherein the sectors comprise one or more of a raw material sector, a cell manufacturing sector, a pack manufacturing sector, a battery manufacturing sector, a consumer sector and a recycling sector.

13. A blockchain-based renting and monitoring system for a power supplying

device comprising:

- a blockchain ledger;
- a middleware server configured to transmit data to and receive data from the blockchain ledger;
- a mobile terminal comprising a renting module configured to transmit an instruction to the middleware server to rent the power supplying device; and
- a power supplying device comprising:
 - a battery;
 - a monitoring module coupled to the battery and configured to monitor one or more battery operation parameters;
 - a main controller coupled to the monitoring module and configured to calculate one or more battery status parameters using the one or more battery operation parameters received from the monitoring module; and
 - a communication module coupled to the main controller and configured to transmit the one or more battery operation parameters and battery status parameters to the middleware server.

14. The system of claim 13, wherein the mobile terminal further comprises a returning module configured to transmit an instruction to the middleware server to return the power supplying device.

15. The system of claim 14, wherein the middleware server comprises a billing module for calculating the rental fee of the power supplying device.

16. The system of claim 13, wherein the one or more battery operation parameters comprise:

- a battery voltage;
- an internal battery temperature;
- an I/O current of the battery; and
- the number of charge/discharge cycles of the battery.

17. The system of claim 13, wherein the one or more battery status parameters comprise:

- a state of charge of the battery;
- a battery capacity; and

cumulative capacity of the battery.

18. The system of claim 13, wherein the communication module comprises a Bluetooth transceiver or a Wi-Fi transceiver.

19. The system of claim 13, wherein the power supplying device further comprises a locking module to disable charging/discharging of the battery.

20. The system of claim 13, wherein the middleware server comprises:

- a communication module configured to receive the one or more battery operation and status parameters;

- an analysis module configured to:

- compare the one or more battery operation parameters and status parameters to a predetermined normal range to determine if the battery is operating under normal conditions, and

- generate an alarm signal to return the power supplying device when the status parameters are outside the predetermined normal range;

- a verification module configured to:

- verify the identity of a user and check that the balance of the user's account contains sufficient credits to allow a deposit to be deducted, and

- create an authorization instruction to allow the verified user to rent the power supplying device if the battery is operating under normal conditions; and

- a memory module configured to record the one or more battery operation and status parameters, and the rental duration of the power supplying device.

21. The system of claim 19, wherein the locking module is configured to disable charging/discharging of the battery when the one or more status parameters are outside the predetermined normal range.

22. The system of claim 20, wherein the memory module is further configured to record the number of charging/discharging cycles of the battery.