based upon a receipt of a signal from a lock sensor indicating a lock pin is secured to the lock; and a cover comprising a lock pin and second circuitry, wherein the second circuitry is configured to generate a response signal based upon a receipt of the request signal; wherein the cover is movable onto a lip portion of the body adjacent to the opening into a lock position to close the opening and secure the lock pin to the lock, and the first circuitry is further configured to process the response signal and switch a status of the lock from an unlock state to a lock state based on a result of the processing of the response signal. Each of the body and the cover further include a transceiver which transmits/receives the request signal and the response signal. The transceiver of the body is located at a part of the lip portion of the body, and the second circuitry and the transceiver of the cover are located within the cover and movable together with the cover, and moving the cover into the lock position causes the transceiver of the cover to move into an effective communication distance of the transceiver of the body.

[0007] In a second aspect, the present disclosure provides a method for authenticating that a cover of a battery container is at a lock position, comprising: moving the cover into the lock position; receiving a signal from a lock sensor indicating a lock pin of the cover of the battery container is secured to a lock of a body of the battery container; generating, by a first circuitry of the body, a request signal; generating, by a second circuitry of the cover, a response signal; processing, by the first circuitry, the response signal; and switching a status of the lock from an unlock state to a lock state based on a result of the processing of the response signal. Moving the cover into the lock position causes a transceiver of the cover to move into an effective communication distance of a transceiver of the body.

[0008] Additional benefits and advantages of the disclosed embodiments will become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various embodiments and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

Brief Description of the Drawings

[0009] Embodiments and implementations are provided by way of example only, and will be better understood and readily apparent to one of ordinary skill in the art from the following written description, read in conjunction with the drawings, in which:

[0010] Figure 1 shows a flowchart illustrating a method implemented by a system comprised in a battery container for authenticating that a cover of the battery container is at a lock position according to an embodiment of the present disclosure.

[0011] Figure 2 shows a flowchart showing an operation flow carried out in a cover and a body of a battery container, respectively, according to an embodiment of the present disclosure.

[0012] Figure 3 shows a front view a battery container according to an embodiment of the present disclosure.

CLAIMS

1. A battery container comprising:

a body with an opening through which a battery can be inserted and extracted, the body comprising a lock and first circuitry, wherein the first circuitry is configured to generate a request signal based upon a receipt of a signal from a lock sensor indicating a lock pin is secured to the lock; and

a cover comprising a lock pin and second circuitry, wherein the second circuitry is configured to generate a response signal based upon a receipt of the request signal;

wherein the cover is movable onto a lip portion of the body adjacent to the opening into a lock position to close the opening and secure the lock pin to the lock, and the first circuitry is further configured to process the response signal and switch a status of the lock from an unlock state to a lock state based on a result of the processing of the response signal,

wherein each of the body and the cover further comprises a transceiver which transmits/receives the request signal and the response signal,

wherein the transceiver of the body is located at a part of the lip portion of the body; and the second circuitry and the transceiver of the cover are located within the cover and movable together with the cover; and

wherein moving the cover into the lock position causes the transceiver of the cover to move within an effective communication distance of the transceiver of the body.

2. The battery container of claim 1, wherein the transceiver of the cover is within the effective communication distance of the transceiver of the body for the transceivers to receive the request signal and the response signal only when the cover is at the lock position.

3. The battery container of claim 1, wherein the cover comprises a rear surface, wherein the rear surface is moved onto the remaining part of the lip portion of the body at the lock position and comprises a signal shielding material that blocks the request signal or the response signal from transmitting through the rear surface of the cover, and wherein the rear surface further comprises a window exposing the transceiver of the cover to the transceiver

of the body located at the part of the lip portion of the body and allowing the transceiver of the cover to receive the request signal from or transmit the response signal to the transceiver of the body.

4. The battery container of any one of claims 1-3, wherein the request signal comprises a first identifier identifying the first circuitry; and the second circuitry is further configured to verify that the request signal comprises the first identifier and generate the response signal further based on a result of the verification of the request signal.

5. The battery container of any one of claims 1-4, wherein the response signal comprises a second identifier identifying the second circuitry; and the first circuitry is further configured to verify that the response signal comprises the second identifier; and switch the status of the lock based on a result of the verification of the response signal.

6. The battery container of any one of claims 1-5, wherein the request signal comprises a single-use request signal and the second circuitry is configured to generate the response signal based on the single-use request signal.

7. The battery container of any one of claims 1-6, wherein the first circuitry is configured to generate an expected response signal and compare the response signal against the expected signal to process the response signal; and switch the status of the lock based on a result of the comparison.

8. The battery container of claim 7, wherein the second circuitry is configured to retrieve an authentication key stored in a second memory in connection with the second circuitry and use the authentication key retrieved from the second memory to generate the response signal from the request signal; and the first circuitry is configured to retrieve a related authentication key corresponding to the second circuitry stored in a first memory in connection with the first circuitry and use the related authentication key retrieved from the first memory to generate the expected response signal from the request signal.

9. The battery container of any one of claims 1-8, wherein the cover further comprises a wire connecting the second circuitry and transceiver of the cover, the wire comprising a wire structure designed to disconnect the second circuitry and transceiver when a length of the wire is extended beyond a threshold length.

10. The battery container of any one of claims 1-9, wherein the first circuitry is configured to generate the request signal further based upon a receipt of another signal indicating a presence of a battery in the body.

11. A method for authenticating that a cover of a battery container is at a lock position, comprising:

moving the cover into the lock position;

receiving a signal from a lock sensor indicating a lock pin of the cover of the battery container is secured to a lock of a body of the battery container;

generating, by a first circuitry of the body, a request signal;

generating, by a second circuitry of the cover, a response signal;

processing, by the first circuitry, the response signal; and

switching a status of the lock from an unlock state to a lock state based on a result of the processing of the response signal,

wherein moving the cover into the lock position causes a transceiver of the cover to move into an effective communication distance of a transceiver of the body.

12. The method of claim 11, further comprising:

transmitting, by the transceiver of the body, the request signal generated by the first circuitry to the cover;

receiving, by the transceiver of the cover, the request signal;

transmitting, by the transceiver of the cover, the response signal generated by the second circuitry to the body; and

receiving, by the transceiver of the body, the response signal.

13. The method of claim 11 or 12, further comprising:

verifying, by the second circuitry, that the request signal comprises a first identifier identifying the first circuitry; wherein the generation of the response signal is further based on a result of the verification of the request signal.

14. The method of any one of claims 11-13, wherein the processing of the response signal comprises:

verifying that the response signal comprises a second identifier identifying the second circuitry, and the switching of the status of the lock is based on a result of the verification of the response signal.

15. The method of any one of claims 11-14, wherein the request signal comprises a single-use request signal, and the generation of the response signal is based on the single-use request signal.

16. The method of any one of claims 11-15, wherein the processing of the response signal comprises:

generating an expected response signal,

comparing the response signal against the expected signal, wherein the switching of the status of the lock is based on a result of the comparison.

17. The method of claim 16, wherein the generation of the response signal comprises:

retrieving an authentication key stored in a second memory in connection with the second circuitry; and

generating the response signal from the request signal using the authentication key retrieved from the second memory; and

wherein the generation of the expected response signal comprises:

retrieving a related authentication key corresponding to the second circuitry stored in a first memory in connection with the first circuitry; and

generating the expected response signal from the request signal using the related authentication key retrieved from the first memory.

18. The method of any one of claims 11-14, further comprising:

receiving another signal from a battery sensory indicating a presence of a battery in the body; and the generation of the request signal is further based upon the receipt of the other signal.