

We claim:

1. An electrical connector for an electric vehicle, the electrical connector comprising:
a connector body;
a plurality of connector pins in the connector body; and
a latch mounted in a latch area on the connector body for holding the electrical connector to the electric vehicle;
wherein the connector body has a plurality of holes for allowing water entering the latch area to exit the latch area.
2. The electrical connector of claim 1, further comprising a light adjacent to the plurality of connector pins.
3. The electrical connector of claim 2, further comprising a second light on a portion of the connector body opposite to the connector pins.
4. The electrical connector of claim 1, wherein the connector body is formed by overmolding.
5. The electrical connector of claim 1, wherein the connector body comprises:
a potting compound;
a premold formed over the potting compound; and
an outer connector body formed in a single piece over the premold.
6. The electrical connector of claim 5, wherein the potting compound comprises a two-part dielectric potting compound.
7. The electrical connector of claim 6, wherein the premold comprises a material selected from the group consisting of polyamide-based materials, glass-filled polyethylene terephthalate, acrylonitrile butadiene styrene, thermoplastic elastomer, thermoplastic vulcanizate, and polypropylene.

8. The electrical connector of claim 7, wherein the outer connector body comprises a material selected from the group consisting of EPT, EPDM and silicone or liquid silicone injection.

9. The electrical connector of claim 5, wherein the premold is formed to provide at least one of cross-linking adhesion, mechanical bonding, and mechanical locking with the outer connector body.

10. The electrical connector of claim 1, wherein the plurality of connector pins comprise a first set of connector pins for a first charging mode and a second set of connector pins for a second charging mode.

11. The electrical connector of claim 10, wherein the first charging mode is an AC charging mode, and wherein the second charging mode is a DC charging mode.

12. A method for making an electrical connector for an electric vehicle, the method comprising:

(a) providing a charging cable and a connector body having at least one connector pin;

(b) providing an electrical connection between the charging cable and the at least one connector pin;

(c) applying a potting compound over the connector body and a portion of the charging cable adjacent to the connector body;

(d) applying a premold over the potting compound, the connector body, and the portion of the charging cable adjacent to the connector body; and

(e) overmolding an outer connector body in a single piece over the premold to form the connector.

13. The method of claim 12, further comprising providing circuitry to control operation of the connector, and wherein step (c) comprises applying the potting compound over the circuitry.

14. The method of claim 12, wherein the potting compound comprises a two-part dielectric potting compound.

15. The method of claim 14, wherein the premold comprises a material selected from the group consisting of polyamide-based materials, glass-filled polyethylene terephthalate, acrylonitrile butadiene styrene, thermoplastic elastomer, thermoplastic vulcanizate, and polypropylene.

16. The method of claim 15, wherein the outer connector body comprises a material selected from the group consisting of EPT, EPDM and silicone or liquid silicone injection.

17. The method of claim 12, wherein the premold is formed to provide at least one of cross-linking adhesion, mechanical bonding, and mechanical locking with the outer connector body.

18. The method of claim 12, further comprising attaching a latch to the connector for latching the connector onto the vehicle.

19. The method of claim 18, wherein the outer connector body has a latch formed therein.

20. The method of claim 19, wherein the outer connector body has a plurality of holes for allowing water entering the latch area to exit the latch area.

21. The method of claim 20, wherein step (e) comprises overmolding the outer connector body to have the plurality of holes.

22. The method of claim 12, wherein step (a) comprises providing a first set of connector pins for a first charging mode and a second set of connector pins for a second charging mode.

23. The method of claim 22, wherein the first charging mode is an AC charging mode, and wherein the second charging mode is a DC charging mode.

We claim:

1. An electrical connector for an electric vehicle, the electrical connector comprising:
a connector body having a latch area formed therein;
a plurality of connector pins in the connector body; and
a latch mounted in the latch area on the connector body for holding the electrical connector to the electric vehicle;
wherein the connector body has a plurality of holes extending from the latch area to a surface of the connector body separate from the latch area for allowing water entering the latch area to exit the latch area.
2. The electrical connector of claim 1, further comprising a light adjacent to the plurality of connector pins.
3. The electrical connector of claim 2, further comprising a second light on a portion of the connector body opposite to the connector pins.
4. The electrical connector of claim 1, wherein the connector body is formed by overmolding.
5. The electrical connector of claim 1, wherein the connector body comprises:
a potting compound;
a premold formed over the potting compound; and
an outer connector body formed in a single piece over the premold.
6. The electrical connector of claim 5, wherein the potting compound comprises a two-part dielectric potting compound.
7. The electrical connector of claim 5, wherein the premold is formed to provide at least one of cross-linking adhesion, mechanical bonding, and mechanical locking with the outer connector body.
8. The electrical connector of claim 6, wherein the premold comprises a material selected from the group consisting of polyamide-based materials, glass-filled polyethylene terephthalate, acrylonitrile butadiene styrene, thermoplastic elastomer, thermoplastic vulcanizate, and polypropylene.
9. The electrical connector of claim 8, wherein the outer connector body comprises a material selected from the group consisting of EPT, EPDM and silicone or liquid silicone injection.
10. The electrical connector of claim 1, wherein the latch area is defined by a depression formed in the connector body.

11. A method for making an electrical connector for an electric vehicle, the method comprising:
 - (a) providing a charging cable and a connector body having at least one connector pin;
 - (b) providing an electrical connection between the charging cable and the at least one connector pin;
 - (c) applying a potting compound over the electrical connection and portions of the connector body and of the charging cable adjacent to the electrical connection to provide a water-impermeable barrier between the electrical connection and components of the electrical connector that may become exposed to water;
 - (d) applying a premold over the potting compound, the connector body, and the portion of the charging cable adjacent to the connector body; and
 - (e) overmolding an outer connector body in a single piece over the premold to form the connector.
12. The method of claim 11, further comprising providing circuitry to control operation of the connector, and wherein step (c) comprises applying the potting compound over the circuitry.
13. The method of claim 11, wherein the potting compound comprises a two-part dielectric potting compound.
14. The method of claim 13, wherein the premold comprises a material selected from the group consisting of polyamide-based materials, glass-filled polyethylene terephthalate, acrylonitrile butadiene styrene, thermoplastic elastomer, thermoplastic vulcanizate, and polypropylene.
15. The method of claim 14, wherein the outer connector body comprises a material selected from the group consisting of EPT, EPDM and silicone or liquid silicone injection.
16. The method of claim 11, wherein the premold is formed to provide at least one of cross-linking adhesion, mechanical bonding, and mechanical locking with the outer connector body.
17. The method of claim 11, further comprising attaching a latch to the connector for latching the connector onto the vehicle.
18. The method of claim 17, wherein the outer connector body has a latch area formed therein.
19. The method of claim 18, wherein the outer connector body has a plurality of holes for allowing water entering the latch area to exit the latch area.
20. The method of claim 19, wherein step (e) comprises overmolding the outer connector body to have the plurality of holes.

21. An electrical connector for an electric vehicle, the electrical connector comprising:
- a connector body having a latch area formed therein;
 - a plurality of connector pins in the connector body, wherein the plurality of connector pins comprise a first set of connector pins for a first charging mode and a second set of connector pins for a second charging mode; and
 - a latch mounted in the latch area on the connector body for latching the electrical connector to the electric vehicle;
- wherein the connector body has a plurality of holes extending from the latch area to a surface of the connector body separate from the latch area for allowing water entering the latch area to exit the latch area.
22. The electrical connector of claim 21, wherein the first charging mode is an AC charging mode, and wherein the second charging mode is a DC charging mode.
23. The electrical connector of claim 21, wherein the latch area is defined by a depression formed in the latch body.
24. A method for making an electrical connector for an electric vehicle, the method comprising:
- (a) providing a charging cable and a connector body having a first set of connector pins for a first charging mode and a second set of connector pins for a second charging mode;
 - (b) providing electrical connections between the charging cable and the first and second sets of connector pins;
 - (c) applying a potting compound over the electrical connections and portions of the connector body and of the charging cable adjacent to the electrical connections to provide a water-impermeable barrier between the electrical connections and components of the electrical connector that may become exposed to water;
 - (d) applying a premold over the potting compound, the connector body, and the portion of the charging cable adjacent to the connector body; and
 - (e) overmolding an outer connector body in a single piece over the premold to form the connector.
25. The method of claim 24, wherein the first charging mode is an AC charging mode, and wherein the second charging mode is a DC charging mode.