Claims

1. A solar cell assembly, comprising:
adjacent layers defining an interior lumen,
sealant between the adjacent layers to seal the interior lumen,
a solar cell within the sealed lumen, and
a coating layer comprising ta-C coated on an external surface of the solar cell assembly, the coating layer comprising ta-C having a thickness of up to 50nm and an sp^3 carbon content of 70% or greater, and the solar cell assembly is a perovskite solar cell.

2. The solar cell assembly according to claim 1, wherein the coating layer comprising ta-C is present on one or more of the adjacent layers and/or the sealant.

3. The solar cell assembly according to claim 1 or 2, wherein the coating layer comprising ta-C is present at the junctions between the sealant and each of the adjacent layers.

4. The solar cell assembly according to any of claims 1 to 3, wherein the adjacent layers are a front layer and a back layer, wherein the front layer is or comprises a substrate to which the solar cell is attached and/or on which the solar cell has been formed.

5. The solar cell assembly according to claim 4, wherein the back layer comprises a coating of ta-C.

6. The solar cell assembly according to claim 4 or 5, wherein the coating layer comprising ta-C coats all of an outer edge of a front layer, an outer edge of a back layer and the sealant.

7. The solar cell assembly according to any of claims 4 to 6, wherein the front layer, and / or the back layer, is/are made of or comprises a transparent material, glass, epoxy or polymer.

8. The solar cell assembly according to claim 7, wherein the transparent material is glass or soda-lime-silica glass.

9. The solar cell assembly according to any preceding claim, wherein the sealant is selected from the group consisting of epoxy resin, ethylene-vinyl acetate, epoxy resin, polyethylene ionomer, polydimethyl siloxane, poly (methyl methacrylate) (PMMA), thermoplastic polyurethane (TPU), polyisobutylene, fluoro polymers (PTFE), polyethylene terephthalate, poly (vinyl alcohol-co-ethylene) (EVOH), paraffin, organo siloxane, silicone and any mixture thereof.

10. The solar cell assembly according to claim 9, wherein the sealant is epoxy resin.

11. The solar cell assembly according to any preceding claim, further comprising two electrodes, a hole transport layer, an electron transport layer and perovskite.

12. The solar cell assembly according to claim 11, wherein the hole transport layer comprises metal oxides (e.g., NiO, Cu_2O, $CuGaO_2$), metal sulfides, metal oxysulfides and / or organic materials such as P3HT, PTAA and PEDOT:PSS, and the electron transport layer comprises PCBM, C60, TiO_2 or SnO_2.

13. The solar cell assembly according to any preceding claim, wherein the assembly is an encapsulated solar cell and all external surfaces thereof comprise a coating layer comprising ta-C.

14. The solar cell assembly according to claim 13, comprising a first electrode, a hole transport layer, perovskite, an electron transport layer and a second electrode.

15. A method of making a solar cell assembly according to any preceding claim, comprising:

(i) providing adjacent, e.g. front and back, layers that when sealed together define an interior lumen,

(ii) providing a perovskite solar cell between the layers,

(iii) locating sealant between the layers to seal the layers together and create a sealed interior lumen containing the solar cell,

(iv) applying a layer comprising ta-C to an external surface of the assembly.

5