subjecting the second article to a second processing cycle to form a second device on the first thin glass sheet.

[0015] According to a fifth aspect, there is provided the method of aspect 4, wherein the carrier is dead-annealed.

[0016] ~~According to a sixth aspect, there is provided the method of aspect 4, wherein t~~The carrier ~~is~~ may be dead-annealed prior to being coupled to the first or second thin glass sheet.

[0017] According to a ~~seventh~~ sixth aspect, there is provided the method of aspect 4, wherein the second thin glass sheet is located on the same side of the carrier as is the first thin glass sheet.

[0018] According to a~~n eighth~~ seventh aspect, there is provided the method of any one of aspects 1-~~7~~6, wherein during the second processing cycle a maximum processing temperature used is less than that used during the first processing cycle.

[0019] According to ~~a ninth~~an eighth aspect, there is provided the method of any one of aspects 1-~~8~~7, wherein the first processing cycle includes a maximum temperature in the range of greater than 450°C to ≤ 700°C.

[0020] ~~According to a tenth aspect, there is provided the method of aspect 9, wherein t~~The second processing cycle may include~~s~~ a maximum temperature ≤ 450°C.

[0021] ~~According to an eleventh aspect, there is provided the method of aspect 9 or aspect 10, wherein t~~The first device ~~is~~ may be a polycrystalline semiconductor device, a microcrystalline semiconductor device, a low temperature poly-silicon device, or a crystalline oxide TFT device.

[0022] ~~According to a twelfth aspect, there is provided the method of any one of aspects 1-8, wherein t~~The first processing cycle may include~~s~~ a maximum temperature in the range of greater than 250°C to ≤ 450°C.

[0023] ~~According to a thirteenth aspect, there is provided the method of aspect 12, wherein t~~The second processing cycle may include~~s~~ a maximum temperature ≤ 250°C.

[0024] ~~According to a fourteenth aspect, there is provided the method of aspect 12 or aspect 13, wherein t~~The first device ~~is~~ may be an amorphous semiconductor device, an amorphous oxide TFT device, or an amorphous silicon LCD.

[0025] ~~According to a fifteenth aspect, there is provided the method of aspect 13 or 14, wherein t~~The second device ~~is~~ may be a touch sensor, a transparent conductive material film, or a color filter.

[0026] According to a ~~sixteenth~~ ninth aspect, there is provided the method of any one of aspects 1-~~7~~6, wherein the second processing cycle maximum temperature is greater than that in the first processing cycle.

[0027] ~~According to a seventeenth aspect, there is provided the method of aspect any one of aspects 1-7 or 16, wherein t~~The first processing cycle may include~~s~~ a maximum temperature in the range of greater than 250°C to ≤450°C.

[0028] ~~According to an eighteenth aspect, there is provided the method of aspect 17, wherein t~~The first device ~~is~~ may be an amorphous semiconductor device, an amorphous oxide TFT, or an amorphous silicon LCD device.

[0029] ~~According to a nineteenth aspect, there is provided the method of any one of aspects 16-18, wherein t~~The second processing cycle maximum temperature ~~is~~ may be in the range of greater than 450°C to ≤ 700°C.

[0030] ~~According to a twentieth aspect, there is provided the method of aspect 19, wherein t~~The second device ~~is~~ may be a polycrystalline semiconductor device, a microcrystalline semiconductor device, a low temperature poly-silicon device, or a crystalline oxide TFT device.~~.~~

[0031] ~~According to a twenty first aspect, there is provided the method of any one of aspects 1-20, wherein t~~The carrier ~~has~~ may have a thickness of ≥ 200 microns.

[0032] ~~According to a twenty second aspect, there is provided the method of any one of aspects 1-21, wherein t~~The thin glass sheet ~~has~~ may have a thickness of ≤ 300 microns.

[0033]. According to a ~~twenty third~~tenth aspect, there is provided the method of any one of aspects 1-~~22~~9, further comprising providing a protective layer on a side of the carrier opposite to that on which the thin glass sheet is located during processing.

[0034] ~~According to a twenty fourth aspect, there is provided the method of aspect 23, wherein t~~The protective layer ~~is~~ may be one of a hard-coat layer and a thin glass sheet.

[0035] ~~According to a twenty fifth aspect, there is provided the method of any one of aspects 1-24, wherein t~~The carrier ~~is~~ may be glass.

[0036] ~~According to a twenty-sixth aspect, there is provided the method of any one of aspects 1-25, wherein t~~The carrier ~~has~~ may have an area ≥ 0.1 square meter.

[0037] ~~According to a twenty-seventh aspect, there is provided the method of any one of aspects 1-26, wherein t~~The thin glass sheet ~~has~~ may have an area ≥ 0.1 square meter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] FIG. 1 is a side view of one embodiment of an article having a thin glass sheet coupled to a carrier.

[0039] FIG. 2 is an exploded view of the article shown in FIG. 1.

[0040] FIG. 3 is a time-temperature graph for a QCOLED compaction test.

[0041] FIG. 4 is a schematic view of scribe lines and node locations for measurements in the QCOLED compaction test of FIG. 3

[0042] FIG. 5 is a schematic process flow.

[0043] FIG. 6 is a side view of a second embodiment of an article having thin glass sheets coupled to a carrier.

[0044] FIG. 7 is a side view of a third embodiment of an article having a thin glass sheet coupled to a carrier.

DETAILED DESCRIPTION

[0045] In the following detailed description, for purposes of explanation and not limitation, example embodiments disclosing specific details are set forth to provide a thorough understanding of various principles of the present invention. However, it will be apparent to one having ordinary skill in the art, having had the benefit of the present disclosure, that the present invention may be practiced in other embodiments that depart from the specific details disclosed herein. Moreover, descriptions of well-known devices, methods and materials may be omitted so as not to obscure the description of various principles of the present invention. Finally, wherever applicable, like reference numerals refer to like elements.

[0046] Ranges can be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another

embodiment. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

CLAIMS

1. Method of processing electronic devices comprising:

obtaining an article comprising a thin glass sheet coupled to a carrier, wherein the carrier has a first QCOLED compaction value;

subjecting the article to a first processing cycle to form a first device on the thin glass sheet, wherein after the first processing cycle, the carrier has a second QCOLED compaction value that is less than or equal to the first QCOLED compaction value;

removing the thin glass sheet from the carrier; and

subjecting the carrier to a second processing cycle to form a second device on the carrier.

2. The method of claim 1, wherein the carrier is chemically strengthened prior to the second processing cycle, and further wherein the second device includes an anti-glare, anti-fingerprint, anti-smudge, or anti-microbial, film.

3. A method of processing electronic devices comprising:

obtaining a first article comprising a first thin glass sheet coupled to a carrier, wherein the carrier has a first QCOLED compaction value;

subjecting the first article to a first processing cycle to form a first device on the first thin glass sheet, wherein after the first processing cycle, the carrier has a second QCOLED compaction value that is less than or equal to the first QCOLED compaction value;

removing the first thin glass sheet from the carrier;

coupling the carrier to a second thin glass sheet to form a second article; and

subjecting the second article to a second processing cycle to form a second device on the second thin glass sheet, wherein after the second processing cycle the carrier QCOLED compaction value decreases ≤ 5%.

4. A method of processing electronic devices comprising:

obtaining a first article comprising a first thin glass sheet coupled to a carrier, wherein the first thin glass sheet has a first QCOLED compaction value, and a second thin glass sheet coupled to the first thin glass sheet and to the carrier;

subjecting the first article to a first processing cycle to form a first device on the second thin glass sheet, wherein after the first processing cycle, the first thin glass sheet has a second QCOLED compaction value that is less than the first QCOLED compaction value;

removing the second thin glass sheet from the first article so as to form a second article; and

subjecting the second article to a second processing cycle to form a second device on the first thin glass sheet.

5. The method of claim 4, wherein the carrier is dead-annealed.

6. The method of claim 4, wherein the second thin glass sheet is located on the same side of the carrier as is the first thin glass sheet.

7. The method of any one of claims 1-6, wherein during the second processing cycle a maximum processing temperature used is less than that used during the first processing cycle.

8. The method of any one of claims 1-7, wherein the first processing cycle includes a maximum temperature in the range of greater than 450°C to ≤ 700°C.

9. The method of any one of claims 1-6, wherein the second processing cycle maximum temperature is greater than that in the first processing cycle.

10. The method of any one of claims 1-9, further comprising providing a protective layer on a side of the carrier opposite to that on which the thin glass sheet is located during processing.

What is Claimed is:

1. Method of processing electronic devices comprising:

obtaining an article comprising a thin glass sheet coupled to a carrier, wherein the carrier has a first QCOLED compaction value;

subjecting the article to a first processing cycle to form a first device on the thin glass sheet, wherein after the first processing cycle, the carrier has a second QCOLED compaction value that is less than or equal to the first QCOLED compaction value;

removing the thin glass sheet from the carrier; and

subjecting the carrier to a second processing cycle to form a second device on the carrier.

2. The method of claim 1, wherein the carrier is chemically strengthened prior to the second processing cycle, and further wherein the second device includes an anti-glare, anti-fingerprint, anti-smudge, or anti-microbial, film.

3. A method of processing electronic devices comprising:

obtaining a first article comprising a first thin glass sheet coupled to a carrier, wherein the carrier has a first QCOLED compaction value;

subjecting the first article to a first processing cycle to form a first device on the first thin glass sheet, wherein after the first processing cycle, the carrier has a second QCOLED compaction value that is less than or equal to the first QCOLED compaction value;

removing the first thin glass sheet from the carrier;

coupling the carrier to a second thin glass sheet to form a second article; and

subjecting the second article to a second processing cycle to form a second device on the second thin glass sheet, wherein after the second processing cycle the carrier QCOLED compaction value decreases ≤ 5%.

4. A method of processing electronic devices comprising:

obtaining a first article comprising a first thin glass sheet coupled to a carrier, wherein the first thin glass sheet has a first QCOLED compaction value, and a second thin glass sheet coupled to the first thin glass sheet and to the carrier;

subjecting the first article to a first processing cycle to form a first device on the second thin glass sheet, wherein after the first processing cycle, the first thin

glass sheet has a second QCOLED compaction value that is less than the first QCOLED compaction value;

removing the second thin glass sheet from the first article so as to form a second article; and

subjecting the second article to a second processing cycle to form a second device on the first thin glass sheet.

5. The method of claim 4, wherein the carrier is dead-annealed.

6. The method of claim 4, wherein the second thin glass sheet is located on the same side of the carrier as is the first thin glass sheet.

7. The method of any one of claims 1, 3, or 4, wherein during the second processing cycle a maximum processing temperature used is less than that used during the first processing cycle.

8. The method of any one of claims 1, 3, or 4, wherein the first processing cycle includes a maximum temperature in the range of greater than 450°C to ≤ 700°C.

9. The method of claim 8, wherein the second processing cycle includes a maximum temperature ≤ 450°C.

10. The method of any one of claims 1, 3, or 4, wherein the first processing cycle includes a maximum temperature in the range of greater than 250°C to ≤ 450°C.

11. The method of claim 10, wherein the second processing cycle includes a maximum temperature ≤ 250°C.

12. The method of any one of claims 1, 3, or 4, wherein the second processing cycle maximum temperature is greater than that in the first processing cycle.

13. The method of claim any one of claims 1, 3, or 4, wherein the first processing cycle includes a maximum temperature in the range of greater than 250°C to ≤450°C.

14. The method of claim 13, wherein the second processing cycle maximum temperature is in the range of greater than 450°C to ≤ 700°C.

15. The method of any one of claims 1, 3, or 4, further comprising providing a protective layer on a side of the carrier opposite to that on which the thin glass sheet is located during processing.