

[0044] Procedure 102 can further comprise process 503 of cutting the intermediate substrate. In many embodiments, performing process 503 can comprise sizing the intermediate substrate based on the carrier substrate and/or the flexible substrate. For example, performing process 503 can comprise cutting (e.g., sizing) the intermediate substrate such that the perimeter of the intermediate substrate is offset (e.g., smaller in at least one lateral dimension) from the perimeter of the carrier substrate by greater than or equal to approximately 1.5 millimeters, or 2 millimeters, etc. (or approximately 1-5 millimeters). Likewise, performing process 503 can also comprise cutting (e.g., sizing) the intermediate substrate such that the perimeter of the intermediate substrate is offset (e.g., larger in at least one lateral dimension) than the perimeter of the flexible substrate. Performing process 503 in this manner can aid in performing procedure 112 (FIG. 1) and/or procedure 113 (FIG. 1) later in method 100 (FIG. 1) by distributing stress formed by performing procedure 112 and/or procedure 113. In some embodiments, process 503 can be omitted, such as where intermediate substrate 503 is pre-sized.

[0045] In some embodiments, procedure 102 can also comprise a process of providing the intermediate substrate where the first intermediate substrate surface comprises a first adhesive (e.g., where the intermediate substrate comprises tape). In these embodiments, process 502 and/or process 503 can be omitted. In further embodiments, this process can be omitted.

[0046] Meanwhile, in the same or other embodiments, procedure 102 can also comprise a process of providing the intermediate substrate where the second intermediate substrate surface comprises a second adhesive (e.g., where the intermediate substrate comprises tape, such as, for example, double-sided tape). In these embodiments, process 502 and/or process 503 can also be omitted. Likewise, in many embodiments, this process can be omitted like the process of providing the intermediate substrate where the first intermediate substrate surface comprises the first adhesive, as described with respect to procedure 101 (FIG. 1).

[0047] Referring back to FIG. 1 again, method 100 can comprise procedure 103 of providing a flexible substrate. The term "flexible substrate" as used herein means a free-standing substrate comprising a flexible material which readily adapts its shape. In some embodiments, the flexible substrate can comprise a low elastic modulus. For example, a low elastic modulus can be considered an elastic modulus of less than approximately five gigapascals.

[0048] The flexible substrate comprises a first flexible substrate surface and a second flexible substrate surface opposite the first flexible substrate surface. The first flexible substrate surface can be configured to be coupled to the second intermediate substrate surface by a second adhesive. Meanwhile, the second flexible substrate surface can be configured such that electronic device(s) are able to be formed over the second flexible substrate surface, such as, for

example, when the first intermediate substrate surface is coupled to the carrier substrate and when the first flexible substrate surface is coupled to the second intermediate substrate surface.

[0049] In some embodiments, performing procedure 103 can comprise a process of providing the flexible substrate where the flexible substrate comprises a flexible substrate material lacking sufficient mechanical strength to prevent the flexible substrate from being damaged if the flexible substrate were to be coupled to and decoupled from the carrier substrate directly.

[0050] Meanwhile, similar to as described above with respect to procedure 101 and/or procedure 102, in some embodiments, performing procedure 103 can comprise a process of providing the flexible substrate where the first flexible substrate surface comprises the second adhesive. In other embodiments, this process can likewise be omitted.

[0051] In many embodiments, procedure 103 can comprise a process of treating the flexible substrate. The process can be similar or identical to performing process 202 (FIG. 2) for the carrier substrate. In many examples, this process and process 202 (FIG. 2) can be performed approximately simultaneously with each other, and/or this process can be performed as part of process 202.

[0052] Meanwhile, method 100 can comprise procedure 104 of providing the first adhesive. In various embodiments, performing procedure 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface. In general, procedure 104 can be performed where the first carrier substrate surface and/or the first intermediate substrate surface do not comprise the first adhesive. Performing procedure 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface according to any suitable technique for applying and/or depositing the first adhesive (e.g., spin-coating, spray-coating, extrusion-coating, preform laminating, slot die coating, screen laminating, screen printing, etc.). For example, performing process 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface by spin coating the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface at a rotational speed of approximately 1000 rotations per minute for approximately 25 seconds and/or at a rotational speed of approximately 3500 rotations per minute for approximately 20 seconds. In some embodiments, procedure 104 can be omitted, such as where the first carrier substrate surface and/or the first intermediate substrate surface already comprise the first adhesive.

[0044] Procedure 102 can further comprise process 503 of cutting the intermediate substrate. In many embodiments, performing process 503 can comprise sizing the intermediate substrate based on the carrier substrate and/or the flexible substrate. For example, performing process 503 can comprise cutting (e.g., sizing) the intermediate substrate such that the perimeter of the intermediate substrate is offset (e.g., smaller in at least one lateral dimension) from the perimeter of the carrier substrate by greater than or equal to approximately 1.5 millimeters, or 2 millimeters, etc. (or approximately 1-5 millimeters). Likewise, performing process 503 can also comprise cutting (e.g., sizing) the intermediate substrate such that the perimeter of the intermediate substrate is offset (e.g., larger in at least one lateral dimension) than the perimeter of the flexible substrate. Performing process 503 in this manner can aid in performing procedure 112 (FIG. 1) and/or procedure 113 (FIG. 1) later in method 100 (FIG. 1) by distributing stress formed by performing procedure 112 and/or procedure 113. In some embodiments, process 503 can be omitted, such as where intermediate substrate 503 is pre-sized.

[0045] In some embodiments, procedure 102 can also comprise a process of providing the intermediate substrate where the first intermediate substrate surface comprises a first adhesive (e.g., where the intermediate substrate comprises tape). In these embodiments, process 502 and/or process 503 can be omitted. In further embodiments, this process can be omitted.

[0046] Meanwhile, in the same or other embodiments, procedure 102 can also comprise a process of providing the intermediate substrate where the second intermediate substrate surface comprises a second adhesive (e.g., where the intermediate substrate comprises tape, such as, for example, double-sided tape). In these embodiments, process 502 and/or process 503 can also be omitted. Likewise, in many embodiments, this process can be omitted like the process of providing the intermediate substrate where the first intermediate substrate surface comprises the first adhesive, as described with respect to procedure 101 (FIG. 1).

[0047] Referring back to FIG. 1 again, method 100 can comprise procedure 103 of providing a flexible substrate. The term "flexible substrate" as used herein means a free-standing substrate comprising a flexible material which readily adapts its shape. In some embodiments, the flexible substrate can comprise a low elastic modulus. For example, a low elastic modulus can be considered an elastic modulus of less than approximately five gigapascals.

[0048] Referring back to FIG. 1 again, method 100 can comprise procedure 103 of providing a flexible substrate. The term "flexible substrate" as used herein means a free-standing substrate comprising a flexible material which readily adapts its shape. In some embodiments, the flexible substrate can comprise a low elastic modulus. For example, a low elastic modulus can be considered an elastic modulus of less than approximately five gigapascals. In some embodiments, the flexible substrate can comprise a flexible glass material.

[0049] In some embodiments, performing procedure 103 can comprise a process of providing the flexible substrate where the flexible substrate comprises a flexible substrate material lacking sufficient mechanical strength to prevent the flexible substrate from being damaged if the flexible substrate were to be coupled to and decoupled from the carrier substrate directly.

[0050] Meanwhile, similar to as described above with respect to procedure 101 and/or procedure 102, in some embodiments, performing procedure 103 can comprise a process of providing the flexible substrate where the first flexible substrate surface comprises the second adhesive. In other embodiments, this process can likewise be omitted.

[0051] In many embodiments, procedure 103 can comprise a process of treating the flexible substrate. The process can be similar or identical to performing process 202 (FIG. 2) for the carrier substrate. In many examples, this process and process 202 (FIG. 2) can be performed approximately simultaneously with each other, and/or this process can be performed as part of process 202.

[0052] Meanwhile, method 100 can comprise procedure 104 of providing the first adhesive. In various embodiments, performing procedure 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface. In general, procedure 104 can be performed where the first carrier substrate surface and/or the first intermediate substrate surface do not comprise the first adhesive. Performing procedure 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface according to any suitable technique for applying and/or depositing the first adhesive (e.g., spin-coating, spray-coating, extrusion-coating, preform laminating, slot die coating, screen laminating, screen printing, etc.). For example, performing process 104 can comprise applying and/or depositing the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface by spin coating the first adhesive at the first carrier substrate surface and/or the first intermediate substrate surface at a rotational speed of approximately 1000 rotations per minute for approximately 25 seconds and/or at a rotational speed of approximately 3500 rotations per minute for approximately 20 seconds. In some embodiments, procedure 104 can be omitted, such as where the first carrier substrate surface and/or the first intermediate substrate surface already comprise the first adhesive.

CLAIMS

What is claimed is:

1) A method comprising:

providing a carrier substrate;
providing an intermediate substrate comprising a first intermediate substrate surface and a second intermediate substrate surface opposite the first intermediate substrate surface;
providing a flexible substrate comprising a first flexible substrate surface and a second flexible substrate surface opposite the first flexible substrate surface;
coupling the first intermediate substrate surface to the carrier substrate with a first adhesive; and
coupling the second intermediate substrate surface to the first flexible substrate surface with a second adhesive.

2) The method of claim 1 wherein:

coupling the first intermediate substrate surface to the carrier substrate with the first adhesive comprises coupling the first intermediate substrate surface to the carrier substrate with an adhesive material, the first adhesive comprising the adhesive material; and
coupling the second intermediate substrate surface to the carrier substrate with the second adhesive comprises coupling the second intermediate substrate surface to the carrier substrate with the adhesive material, the second adhesive comprising the adhesive material.

3) The method of claim 1 or 2 further comprising at least one of:

providing the first adhesive; or
providing the second adhesive.

4) The method of claim 3 wherein at least one of:

providing the first adhesive comprises applying the first adhesive, wherein:

applying the first adhesive comprises at least one of spin-coating, spray-coating, extrusion-coating, preform laminating, slot die coating, screen laminating, or screen printing the first adhesive at one or both of the carrier substrate and the first intermediate substrate surface;

or

providing the second adhesive comprises applying the second adhesive, wherein:

applying the second adhesive comprises at least one of spin-coating, spray-coating, extrusion-coating, preform laminating, slot die coating, screen laminating, or screen printing the second adhesive at one or both of the second intermediate substrate surface and the first flexible substrate surface.

5) The method of any one of claims 1-4 wherein at least one of:

providing the carrier substrate comprises providing the carrier substrate having a carrier substrate material comprising at least one of alumina, silicon, steel, sapphire, barium borosilicate, soda lime silicate, or alkali silicate;

providing the flexible substrate comprises providing the flexible substrate having a flexible glass material;

or

providing the intermediate substrate comprises providing the intermediate substrate having an intermediate substrate material comprising at least one of polyethylene naphthalate, polyethylene terephthalate, polyethersulfone, polyimide, polycarbonate, cyclic olefin copolymer, or liquid crystal polymer.

6) The method of any one of claims 1-5 wherein at least one of:

coupling the first intermediate substrate surface to the carrier substrate with the first adhesive comprises bonding the first intermediate substrate surface to the carrier substrate with the first adhesive using at least one of a roll press or a bladder press;

or

coupling the second intermediate substrate surface to the first flexible substrate surface with the second adhesive comprises bonding the second intermediate substrate surface to the first flexible substrate surface with the second adhesive using the at least one of the roll press or the bladder press.

7) The method of claim 6 wherein at least one of:

bonding the first intermediate substrate surface to the carrier substrate occurs at a first condition comprising at least one of:

- a first pressure greater than or equal to approximately 0 kilopascals and less than or equal to approximately 69 kilopascals;
- a first temperature greater than or equal to approximately 20°C and less than or equal to approximately 100°C; or
- a first feed rate greater than or equal to approximately 0.25 meters per minute and less than or equal to approximately 0.5 meters per minute;

or

bonding the second intermediate substrate surface to the first flexible substrate surface occurs at a second condition comprising at least one of:

- a second pressure greater than or equal to approximately 0 kilopascals and less than or equal to approximately 138 kilopascals;
- a second temperature greater than or equal to approximately 20°C and less than or equal to approximately 100°C; or
- a second feed rate greater than or equal to approximately 0.25 meters per minute and less than or equal to approximately 0.5 meters per minute.

8) The method of any one of claims 1-7 wherein:

- providing the carrier substrate comprises treating the carrier substrate before coupling the first intermediate substrate surface to the carrier substrate, wherein treating the carrier substrate comprises at least one of:
 - cleaning the carrier substrate; or
 - ashing the carrier substrate.

9) The method of any one of claims 1-8 wherein:

- providing the intermediate substrate comprises at least one of:
 - baking the intermediate substrate at a preliminary baking condition comprising at least one of:
 - a preliminary baking temperature of approximately 200°C;
 - a preliminary baking pressure of approximately 0.004 kilopascals; or
 - a preliminary baking time of approximately 1 hour;

or

cutting the intermediate substrate, wherein cutting the intermediate substrate comprises sizing the intermediate substrate based on a size of at least one of the carrier substrate or the flexible substrate.

- 10) The method of any one of claims 1-9 further comprising:
baking the carrier substrate, the intermediate substrate, the flexible substrate, the first adhesive, and the second adhesive after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface.
- 11) The method of any one of claims 1-10 further comprising:
forming one or more electronic devices over the second flexible substrate surface after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface.
- 12) The method of any one of claims 1-11 further comprising:
after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface, decoupling the first intermediate substrate surface from the carrier substrate.
- 13) The method of claim 12 further comprising:
after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface, decoupling the second intermediate substrate surface from the first flexible substrate surface after decoupling the first intermediate substrate from the carrier substrate.
- 14) A method of providing one or more electronic devices, the method comprising:
providing a carrier substrate;
providing a flexible substrate; and
interposing a ruggedization film between the carrier substrate and the flexible substrate in order to couple the flexible substrate to the carrier substrate, the ruggedization film

being configured to substantially relieve stress formed at the flexible substrate when the flexible substrate is decoupled from the carrier substrate.

15) The method of claim 14 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a first adhesive, further wherein one of: (a) at least one of the carrier substrate or the first ruggedization film surface comprises the first adhesive, or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first adhesive at the carrier substrate or providing the first adhesive at the first ruggedization film surface; and

coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive after coupling the first ruggedization film surface to the carrier substrate, the second ruggedization film surface being opposite to the first ruggedization film surface, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive, or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second ruggedization film surface or providing the second adhesive at the first flexible substrate surface.

16) The method of claim 14 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second

ruggedization film surface or providing the second adhesive at the first flexible film surface; and

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a second adhesive after coupling the second ruggedization film surface to the first flexible substrate, the first ruggedization film surface being opposite to the second ruggedization film surface, further wherein one of: (a) at least one of the first ruggedization film surface or the carrier substrate comprises the second adhesive or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first adhesive at the first ruggedization film surface or providing the first adhesive at the carrier substrate.

17) The method of claim 14 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a first adhesive, further wherein one of: (a) at least one of the carrier substrate or the first ruggedization film surface comprises the first adhesive or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first adhesive at the carrier substrate or providing the first adhesive at the first ruggedization film surface; coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive, the second ruggedization film surface being opposite to the first ruggedization film surface, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second ruggedization film surface or providing the second adhesive at the first flexible substrate surface;

and

coupling the first ruggedization film surface to the carrier substrate and coupling the second ruggedization film surface to the first flexible substrate surface occur approximately simultaneously with each other.

- 18) The method of any one of claims 15-17 further comprising:
forming the one or more electronic devices over a second flexible substrate surface of the flexible substrate, the second flexible substrate surface being opposite to the first flexible substrate surface.
- 19) The method of any one of claims 14-18 wherein:
interposing the ruggedization film between the carrier substrate and the flexible substrate comprises coupling the ruggedization film to the flexible substrate in order to reinforce the flexible substrate.
- 20) The method of any one of claims 14-19 further comprising:
decoupling the first ruggedization film surface from the carrier substrate after interposing the ruggedization film between the carrier substrate and the flexible substrate; and
substantially relieving stress formed at the flexible substrate with the ruggedization film while the flexible substrate is being decoupled from the carrier substrate.
- 21) An electronic device structure, the electronic device structure comprising:
an intermediate substrate comprising a first intermediate substrate surface and a second intermediate substrate surface opposite the first intermediate substrate surface, the first intermediate substrate surface being configured to be coupled to a carrier substrate by a first adhesive; and
a flexible substrate comprising a first flexible substrate surface and a second flexible substrate surface opposite the first flexible substrate surface, the first flexible substrate surface being configured to be coupled to the second intermediate substrate surface by a second adhesive and the second flexible substrate surface being configured such that one or more electronic devices are able to be formed over the second flexible substrate surface when the first intermediate substrate surface is coupled to the carrier substrate and when the first flexible substrate surface is coupled to the second intermediate substrate surface.
- 22) The electronic device structure of claim 21 further comprising:
the carrier substrate.

- 23) The electronic device structure of claim 21 or 22 further comprising:
the first adhesive and the second adhesive, wherein the first adhesive couples the first intermediate substrate surface to the carrier substrate and the second adhesive couples the second intermediate substrate surface to the first flexible substrate surface.
- 24) The electronic device structure of any one of claims 21-23 wherein:
the first adhesive comprises an adhesive material; and
the second adhesive comprises the adhesive material.
- 25) The electronic device structure of any one of claims 21-24 wherein:
the first adhesive comprises one of Henkel NS122 adhesive, EccoCoat 3613 adhesive, or a pressure sensitive adhesive; and
the second adhesive comprises the one of the Henkel NS122 adhesive, the EccoCoat 3613 adhesive, or the pressure sensitive adhesive.
- 26) The electronic device structure of any one of claims 21-25 wherein at least one of:
the carrier substrate comprises at least one of alumina, silicon, steel, sapphire, barium borosilicate, soda lime silicate, or alkali silicate;
the flexible substrate comprises a flexible glass material; or
the intermediate substrate comprises at least one of polyethylene naphthalate, polyethylene terephthalate, polyethersulfone, polyimide, polycarbonate, cyclic olefin copolymer, or liquid crystal polymer.
- 27) The electronic device structure of any one of claims 21-26 further comprising:
a nitride barrier layer between the second flexible substrate surface and the one or more electronic devices.
- 28) The electronic device structure of any one of claims 21-27 further comprising:
the one or more electronic devices over the second flexible substrate surface.
- 29) The electronic device structure of any one of claims 21-28 wherein:
the one or more electronic devices comprise at least one of an electronic sensor, an electronic display, an electronic transistor, an electronic diode, or a micro-electromechanical system.

- 30) The electronic device structure of any one of claims 21-29 wherein:
the intermediate substrate is configured to be decoupled from the carrier substrate and
the flexible substrate without damaging the one or more electronic devices on the
flexible substrate.

CLAIMS

What is claimed is:

1) A method comprising:

- providing a carrier substrate;
- providing an intermediate substrate comprising a first intermediate substrate surface and a second intermediate substrate surface opposite the first intermediate substrate surface;
- providing a flexible substrate comprising a first flexible substrate surface and a second flexible substrate surface opposite the first flexible substrate surface;
- coupling the first intermediate substrate surface to the carrier substrate with a first adhesive; and
- coupling the second intermediate substrate surface to the first flexible substrate surface with a second adhesive.

2) The method of claim 1 further comprising at least one of:

- providing the first adhesive at one or both of the carrier substrate and the first intermediate substrate surface; or
- providing the second adhesive at one or both of the second intermediate substrate surface and the first flexible substrate surface.

3) The method of claim 1 wherein at least one of:

- the first adhesive comprises an adhesive material, and the second adhesive comprises the adhesive material;
- providing the carrier substrate comprises providing the carrier substrate having a carrier substrate material comprising at least one of alumina, silicon, steel, sapphire, barium borosilicate, soda lime silicate, or alkali silicate;
- providing the flexible substrate comprises providing the flexible substrate having a flexible glass material;
- providing the intermediate substrate comprises providing the intermediate substrate having an intermediate substrate material comprising at least one of polyethylene

naphthalate, polyethylene terephthalate, polyethersulfone, polyimide, polycarbonate, cyclic olefin copolymer, or liquid crystal polymer;
providing the carrier substrate comprises treating the carrier substrate before coupling the first intermediate substrate surface to the carrier substrate, wherein treating the carrier substrate comprises at least one of:

cleaning the carrier substrate; or
ashing the carrier substrate;

or

baking the carrier substrate, the intermediate substrate, the flexible substrate, the first adhesive, and the second adhesive after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface.

4) The method of claim 1 wherein at least one of:

coupling the first intermediate substrate surface to the carrier substrate with the first adhesive comprises bonding the first intermediate substrate surface to the carrier substrate with the first adhesive using at least one of a roll press or a bladder press;

or

coupling the second intermediate substrate surface to the first flexible substrate surface with the second adhesive comprises bonding the second intermediate substrate surface to the first flexible substrate surface with the second adhesive using the at least one of the roll press or the bladder press.

5) The method of claim 4 wherein at least one of:

bonding the first intermediate substrate surface to the carrier substrate occurs at a first condition comprising at least one of:

a first pressure greater than or equal to approximately 0 kilopascals and less than or equal to approximately 69 kilopascals;

a first temperature greater than or equal to approximately 20°C and less than or equal to approximately 100°C; or

a first feed rate greater than or equal to approximately 0.25 meters per minute and less than or equal to approximately 0.5 meters per minute;

or

bonding the second intermediate substrate surface to the first flexible substrate surface occurs at a second condition comprising at least one of:

a second pressure greater than or equal to approximately 0 kilopascals and less than or equal to approximately 138 kilopascals;

a second temperature greater than or equal to approximately 20°C and less than or equal to approximately 100°C; or

a second feed rate greater than or equal to approximately 0.25 meters per minute and less than or equal to approximately 0.5 meters per minute.

6) The method of claim 1 wherein:

providing the intermediate substrate comprises at least one of:

baking the intermediate substrate at a preliminary baking condition comprising at least one of:

a preliminary baking temperature of approximately 200°C;

a preliminary baking pressure of approximately 0.004 kilopascals; or

a preliminary baking time of approximately 1 hour;

or

cutting the intermediate substrate, wherein cutting the intermediate substrate comprises sizing the intermediate substrate based on a size of at least one of the carrier substrate or the flexible substrate.

7) The method of any one of claims 1-6 further comprising:

forming one or more electronic devices over the second flexible substrate surface after

coupling the first intermediate substrate surface to the carrier substrate and after

coupling the second intermediate substrate surface to the first flexible substrate surface.

8) The method of claim 7 further comprising:

after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface, decoupling the first intermediate substrate surface from the carrier substrate.

9) The method of claim 8 further comprising:

after coupling the first intermediate substrate surface to the carrier substrate and after coupling the second intermediate substrate surface to the first flexible substrate surface, decoupling the second intermediate substrate surface from the first flexible substrate surface after decoupling the first intermediate substrate from the carrier substrate.

10) A method of providing one or more electronic devices, the method comprising:

providing a carrier substrate;

providing a flexible substrate; and

interposing a ruggedization film between the carrier substrate and the flexible substrate in order to couple the flexible substrate to the carrier substrate, the ruggedization film being configured to substantially relieve stress formed at the flexible substrate when the flexible substrate is decoupled from the carrier substrate.

11) The method of claim 10 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a first adhesive, further wherein one of: (a) at least one of the carrier substrate or the first ruggedization film surface comprises the first adhesive, or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first adhesive at the carrier substrate or providing the first adhesive at the first ruggedization film surface; and

coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive after coupling the first ruggedization film surface to the carrier substrate, the second

ruggedization film surface being opposite to the first ruggedization film surface, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive, or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second ruggedization film surface or providing the second adhesive at the first flexible substrate surface.

12) The method of claim 11 further comprising:

forming the one or more electronic devices over a second flexible substrate surface of the flexible substrate, the second flexible substrate surface being opposite to the first flexible substrate surface.

13) The method of claim 10 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second ruggedization film surface or providing the second adhesive at the first flexible film surface; and

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a second adhesive after coupling the second ruggedization film surface to the first flexible substrate substrate, the first ruggedization film surface being opposite to the second ruggedization film surface, further wherein one of: (a) at least one of the first ruggedization film surface or the carrier substrate comprises the second adhesive or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first

adhesive at the first ruggedization film surface or providing the first adhesive at the carrier substrate.

14) The method of claim 10 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises:

coupling a first ruggedization film surface of the ruggedization film to the carrier substrate with a first adhesive, further wherein one of: (a) at least one of the carrier substrate or the first ruggedization film surface comprises the first adhesive or (b) coupling the first ruggedization film surface to the carrier substrate comprises at least one of providing the first adhesive at the carrier substrate or providing the first adhesive at the first ruggedization film surface; coupling a second ruggedization film surface of the ruggedization film to a first flexible substrate surface of the flexible substrate with a second adhesive, the second ruggedization film surface being opposite to the first ruggedization film surface, further wherein one of: (a) at least one of the second ruggedization film surface or the first flexible substrate surface comprises the second adhesive or (b) coupling the second ruggedization film surface to the first flexible substrate surface comprises at least one of providing the second adhesive at the second ruggedization film surface or providing the second adhesive at the first flexible substrate surface;

and

coupling the first ruggedization film surface to the carrier substrate and coupling the second ruggedization film surface to the first flexible substrate surface occur approximately simultaneously with each other.

15) The method of claim 10 wherein:

interposing the ruggedization film between the carrier substrate and the flexible substrate comprises coupling the ruggedization film to the flexible substrate in order to reinforce the flexible substrate.

16) The method of claim 10 further comprising:

decoupling the first ruggedization film surface from the carrier substrate after interposing the ruggedization film between the carrier substrate and the flexible substrate; and substantially relieving stress formed at the flexible substrate with the ruggedization film while the flexible substrate is being decoupled from the carrier substrate.

17) An electronic device structure, the electronic device structure comprising:

an intermediate substrate comprising a first intermediate substrate surface and a second intermediate substrate surface opposite the first intermediate substrate surface, the first intermediate substrate surface being configured to be coupled to a carrier substrate by a first adhesive; and

a flexible substrate comprising a first flexible substrate surface and a second flexible substrate surface opposite the first flexible substrate surface, the first flexible substrate surface being configured to be coupled to the second intermediate substrate surface by a second adhesive and the second flexible substrate surface being configured such that one or more electronic devices are able to be formed over the second flexible substrate surface when the first intermediate substrate surface is coupled to the carrier substrate and when the first flexible substrate surface is coupled to the second intermediate substrate surface;

wherein:

the intermediate substrate is configured to be decoupled from the carrier substrate and the flexible substrate without damaging the one or more electronic devices or the flexible substrate.

18) The electronic device structure of claim 17 further comprising at least one of:

at least part of the first adhesive; or

the second adhesive;

wherein:

the first adhesive comprises one of Henkel NS122 adhesive, EccoCoat 3613 adhesive, or a pressure sensitive adhesive; and

the second adhesive comprises the one of the Henkel NS122 adhesive, the EccoCoat 3613 adhesive, or the pressure sensitive adhesive.

- 19) The electronic device structure of claim 17 wherein at least one of:
- the carrier substrate comprises at least one of alumina, silicon, steel, sapphire, barium borosilicate, soda lime silicate, or alkali silicate;
 - the flexible substrate comprises a flexible glass material; or
 - the intermediate substrate comprises at least one of polyethylene naphthalate, polyethylene terephthalate, polyethersulfone, polyimide, polycarbonate, cyclic olefin copolymer, or liquid crystal polymer.
- 20) The electronic device structure of any one of claims 17-19 further comprising at least one of:
- a nitride barrier layer between the second flexible substrate surface and the one or more electronic devices; or
 - the one or more electronic devices over the second flexible substrate surface.