ever, the use of such grading composition release layers is not required. In other embodiments, a non-graded composition release layer (e.g., a release layer having homogeneous composition across its thickness) may instead be used. Protuberances may still be formed by etching such a non-graded composition release layer based on the positions of the etchant access openings. For example, protuberances generally centered under a semiconductor device may be formed by including etchant access openings disposed around the perimeter of the semiconductor device. In some embodiments, the positions and/or sizes of the etchant access openings may be arranged to achieve a desired shape and/or size of the protuberance. Accordingly, in the various embodiments disclosed herein the graded composition release layers may optionally be replaced by a non-graded or homogeneous composition release layer.

[0080] The operations, features, and other details described for any of FIGS. **2**A-**2**C, FIGS. **3**A-**3**I, FIGS. **4**-**5**, and FIGS. **6**A-**6**D may also optionally be used in any of FIGS. **1**, **7**, and **8**. Moreover, components, features, and details described herein for any of the apparatus (e.g., the workpiece objects, intermediate substrates, etc.) may also optionally be used in any of the methods described herein, which in embodiments may be performed on or with such apparatus.

[0081] The semiconductor devices separated as disclosed herein may be used in a variety of different modules, electronic devices, or systems. For example, in the case of photovoltaic cells or devices, they may be used in modules for personal electronic devices (e.g., laptops, cell phones, cameras, other portable electronic devices), outdoor gear (e.g., outdoor lighting), military equipment (e.g., communication equipment, positioning equipment, etc.), building-integrated photovoltaics, rooftop photovoltaics, ground-mounted solar farms, roadside emergency telephones, remote sensing, and cathodic protection of pipelines, and various other known uses of solar cells.

[0082] In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiments. It will be apparent however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. The particular embodiments described are not provided to limit the invention but to illustrate it. The scope of the invention is not to be determined by the specific examples provided above but only by the claims below. In other instances, well-known structures, devices, and operations have been shown in block diagram form or without detail in order to avoid obscuring the understanding of the description. Where considered appropriate, reference numerals or terminal portions of reference numerals have been repeated in the figure to indicate corresponding or analogous elements, which may optionally have similar characteristics.

[0083] It should also be appreciated that reference throughout this specification to "one embodiment", "an embodiment", "one or more embodiments", or "different embodiments", for example, means that a particular feature may be included in the practice of the invention. Similarly, it should be appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects. This method of disclosure, however, is not to be interpreted as reflecting an intention that the invention requires more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects may lie in less than all features of a single disclosed embodiment. Thus, the claims following the Detailed Description are hereby expressly incorporated into this Detailed Description, with each claim standing on its own as a separate embodiment of the invention.

What is claimed is:

1. A method comprising:

etching a release layer that is coupled between a plurality of semiconductor devices and a substrate with an etch, including:

etching the release layer between the semiconductor devices and the substrate until the semiconductor devices are at least substantially released from the substrate; and

etching a protuberance in the release layer between each of the semiconductor devices and the substrate;

stopping the etching while the protuberances remain between each of the semiconductor devices and the substrate; and

separating the semiconductor devices from the substrate.

2. The method of claim **1**, wherein etching the release layer comprises etching a graded composition release layer with the etch that has an etch rate that depends on a composition of at least one component that is graded across a thickness of the graded composition release layer.

3. The method of claim **2**, wherein etching the graded composition release layer comprises etching a graded composition group III-V compound semiconductor release layer.

4. The method of claim **1**, wherein etching the release layer comprises etching the release layer coupled between photovoltaic cells and the substrate.

5. The method of claim **1**, further comprising forming at least one anchor that is coupled between a semiconductor device of the plurality and an adjacent fixed structure prior to etching the protuberances.

6. The method of claim **5**, wherein firming the anchor comprises:

depositing a layer of photoresist over the semiconductor device and the adjacent fixed structure; and

photolithographically patterning the layer of the photoresist to leave a portion of the layer of the photoresist corresponding to the anchor coupled with the semiconductor device and the adjacent fixed structure while removing a portion of the layer of the photoresist around the anchor.

7. The method of claim **5**, wherein separating the semiconductor devices from the substrate comprises at least one of: (a) breaking the anchor; and (b) separating the anchor from at least one of the semiconductor device and the adjacent fixed structure.

8. The method of claim **1**, wherein separating the semiconductor devices from the substrate comprises:

coupling at least one receiving substrate with the semiconductor devices; and

separating the at least one receiving substrate and the semiconductor devices from the substrate.

9. The method of claim **8**, wherein etching the release layer comprises etching a graded composition release layer, and wherein separating the semiconductor devices from the substrate comprises:

coupling a first receiving substrate with a first portion of the semiconductor devices;