CLAIMS:

1. A scintillation article comprising:

   a detector housing comprising a window cavity; and

   a window disposed within the window cavity, the window cavity defining a window opening at an external surface of the housing that has a greater width than a width of the window, and wherein a surface of the window is directly bonded to an interior surface of the detector housing at a bond joint comprising a diffusion bond region.

2. The scintillation article of claim 1, wherein the bond joint comprises a braze material.

3. The scintillation article of claim 2, wherein the braze material comprises an oxide material.

4. The scintillation article of claim 2, wherein the diffusion bond region comprises a region at the interface between the detector housing and braze material of interdiffusion between the materials of the braze material and the housing at the bond joint.

5. The scintillation article of claim 1, wherein the detector housing comprises a protrusion extending radially inward from an inner surface of the detector housing.

6. The scintillation article of claim 5, wherein the window cavity is a region defined between the protrusion and a distal end of the housing.

7. The scintillation article of claim 6, wherein the housing comprises a scintillator cavity and the protrusion separates the scintillator cavity and the window cavity within an interior of the housing.

8. The scintillation article of claim 5, wherein the protrusion comprises a forward

surface directly contacting the window, and wherein the protrusion comprises a rear surface directly contacting an interface pad.

9. A scintillation article comprising:

a detector housing comprising a window cavity; and

a window comprising a crystalline material disposed within the window cavity, the window having a front surface, a rear surface generally parallel to the front surface, and a side surface extending between the front surface and rear surface, wherein a portion of the rear surface is directly contacting an inner surface of the housing.

10. The scintillation article of claim 9, wherein a side surface of the window is directly bonded to an inner surface of the housing at a bond joint comprising a diffusion bond region.

11. The scintillation article of claim 9, wherein:

the window cavity is disposed at a distal end of the detector housing at an external, front surface of the detector housing;

the window cavity is defined as a region between a protrusion extending radially inward from an inner surface of the detector housing and a front surface of the detector housing; and

the window protrudes axially from the detector housing beyond the front surface of the detector housing.

12. A scintillation article comprising:

a detector housing; and

a window disposed within the housing, the window having a front surface, a rear surface generally parallel to the front surface, and a side surface extending between the front surface and rear surface at a substantially perpendicular angle to the front surface, wherein the detector has a photo collection efficiency of at least about 74%.

13. The scintillation article of claim 12, wherein:

the side surface of the window extends at a substantially perpendicular angle

to the rear surface of the window;

a portion of the rear surface of the window is directly contacting an inner surface of the detector housing; and

the portion of the rear surface of the window is directly contacting a surface of a protrusion extending radially inward from the inner surface of the housing.

14. A scintillation article comprising:

a detector housing comprising a window cavity within the detector housing; and

a window disposed within the window cavity, the window having a front surface and a rear surface parallel to the front surface, wherein the front surface has a width that is at least the same width of the rear surface and wherein a portion of the rear surface is directly contacting an inner surface of the detector housing.

15. The scintillation article of claim 14, wherein the window cavity is defined as a region between a small opening having a small diameter and a large opening having a large diameter, wherein the large opening is positioned at a distal end of the detector housing at an external, front surface of the detector housing.

CLAIMS:

1. A scintillation article comprising:

   a detector housing comprising a window cavity; and

   a window disposed within the window cavity, the window cavity defining a window opening at an external surface of the housing that has a greater width than a width of the window, and wherein a surface of the window is directly bonded to an interior surface of the detector housing at a bond joint comprising a diffusion bond region.

2. The scintillation article of claim 1, wherein the bond joint comprises a braze material.

3. The scintillation article of claim 2, wherein the braze material comprises an oxide material.

4. The scintillation article of claim 2, wherein the diffusion bond region comprises a region at the interface between the detector housing and braze material of interdiffusion between the materials of the braze material and the housing at the bond joint.

5. The scintillation article of claim 1, wherein the detector housing comprises a protrusion extending radially inward from an inner surface of the detector housing.

6. The scintillation article of claim 5, wherein the window cavity is a region defined between the protrusion and a distal end of the housing.

7. The scintillation article of claim 6, wherein the housing comprises a scintillator cavity and the protrusion separates the scintillator cavity and the window cavity within an interior of the housing.

8. The scintillation article of claim 5, wherein the protrusion comprises a forward surface directly contacting the window, and wherein the protrusion comprises a rear surface directly contacting an interface pad.

9. A scintillation article comprising:

a detector housing comprising a window cavity; and

a window comprising a crystalline material disposed within the window cavity, the window having a front surface, a rear surface generally parallel to the front surface, and a side surface extending between the front surface and rear surface, wherein a portion of the rear surface is directly contacting an inner surface of the housing, and wherein a side surface of the window is directly bonded to an inner surface of the housing at a bond joint comprising a diffusion bond region.

10. The scintillation article of claim 9, wherein:

the window cavity is disposed at a distal end of the detector housing at an external, front surface of the detector housing;

the window cavity is defined as a region between a protrusion extending radially inward from an inner surface of the detector housing and a front surface of the detector housing; and

the window protrudes axially from the detector housing beyond the front surface of the detector housing.

11. A scintillation article comprising:

a detector housing; and

a window disposed within the housing, the window having a front surface, a rear surface generally parallel to the front surface, and a side surface extending between the front surface and rear surface at a substantially perpendicular angle to the front surface, wherein the detector has a photo collection efficiency of at least about 74% when the scintillation article receives a 662 keV gamma ray.

12. The scintillation article of claim 11, wherein:

the side surface of the window extends at a substantially perpendicular angle to the rear surface of the window;

a portion of the rear surface of the window is directly contacting an inner surface of the detector housing; and

the portion of the rear surface of the window is directly contacting a surface of a protrusion extending radially inward from the inner surface of the housing.

13. A scintillation article comprising:

a detector housing comprising a window cavity within the detector housing; and

a window disposed within the window cavity, the window having a front surface and a rear surface parallel to the front surface, wherein the front surface has a width that is at least the same width of the rear surface and a portion of the rear surface is directly contacting an inner surface of the detector housing; and wherein the window cavity is defined as a region between a small opening having a small diameter and a large opening having a large diameter, wherein the large opening is positioned at a distal end of the detector housing at an external, front surface of the detector housing.