METHOD OF MAKING DELAMINATION RESISTANT ASSEMBLIES

Background

Emerging solar technologies such as organic photovoltaic devices (OPVs) and thin film solar cells like Copper Indium Gallium di-Selenide (CIGS) require protection from water vapor and need to be durable (e.g., to ultra-violet (UV) light) in outdoor environments. Typically, glass has been used as an encapsulating material for such solar devices because glass is a very good barrier to water vapor, is optically transparent, and is stable to UV light. However, glass is heavy, brittle, difficult to make flexible, and difficult to handle. There has been interest in developing transparent flexible encapsulating materials to replace glass that will not share the drawbacks of glass but have glass-like barrier properties and UV stability, and a number of flexible barrier films have been developed that approach the barrier properties of glass.

Solar devices are used outdoors, and so are exposed to the elements, including wind, water and sunlight. Water penetration into solar panels has been a long-standing problem. Solar panels may also be deleteriously affected by wind and sunlight.

Many flexible barrier films are multi-layer film laminates. Any multi-layer film laminate has the potential for delamination, especially at the edges. Reducing delamination at the edges will improve overall performance of the barrier films.

Summary

~~The present application is directed to~~ An aspect of the present invention provides a method of reducing delamination in an assembly. The method comprises providing an assembly and limiting visible light exposure to parts of the assembly to maintain a peel force of 20 grams/inch or greater where the light is limited. The assembly compromises an electronic device, a substrate having a first surface and a second surface opposite the first surface, wherein the second surface of the substrate is disposed on the electronic device, a barrier stack disposed on the first surface of the ~~substrat~~substrate, and a weatherable sheet adjacent the barrier film opposite the substrate. The assembly is transmissive to visible and infrared light.

Detailed Description

Edge delamination is a concern for multi-layer films. For example, a multilayer assembly comprising an encapsulant layer; a substrate having a first surface and a second surface opposite the first surface, wherein the second surface of the substrate is disposed on the encapsulant layer; a barrier stack disposed on the first surface of the substrate; and a weatherable sheet adjacent the barrier film opposite the substrate may be subject to edge delamination, especially when exposed to visible light. Slight edge delamination may cause separation of the multiple layers in the assembly. It has been found that delamination can be controlled by the assessment, control and modification of three inputs. The first