processing.

In one aspect, the present disclosure provides a barrier film comprising a substrate, a first polymer layer on a major surface of the substrate, an oxide layer on the first polymer layer, and a second polymer layer on the oxide layer, wherein at least one of the first or second polymer layers comprises a siloxane reaction product of a secondary or tertiary amino-functional silane having at least two independently selected silane groups, wherein the secondary or tertiary amino-functional silane is other than bis-(gamma-triethoxysilylpropyl)amine.

In another aspect, the disclosure describes a method of making a barrier film, the method comprising providing a first polymer layer to a surface of a substrate, providing an oxide layer on the first polymer layer, and providing a second polymer layer on the oxide layer, wherein at least one of the first or second polymer layers comprises a siloxane reaction product of a secondary or tertiary amino-functional silane having at least two silane groups, wherein the secondary or tertiary amino-functional silane is other than bis-(gamma-triethoxysilylpropyl)amine.

In a further aspect, the disclosure describes an article incorporating a barrier film according to and/or made according to the foregoing aspects, wherein the article is selected from a solid state lighting device, a display device, and combinations thereof.

In another aspect, the present disclosure provides a barrier assembly comprising the barrier film according to and/or made according to the foregoing aspects, wherein a major surface of the barrier film is adhered to a top sheet with a pressure sensitive adhesive.

In this application:

Terms such as "a", "an" and "the" are not intended to refer to only a singular entity, but include the general class of which a specific example may be used for illustration. The terms "a", "an", and "the" are used interchangeably with the term "at least one".

The phrase "comprises at least one of" followed by a list refers to comprising any one of the items in the list and any combination of two or more items in the list. The phrase "at least one of" followed by a list refers to any one of the items in the list or any combination of two or more items in the list.

"Alkyl group" and the prefix "alk-" are inclusive of both straight chain and branched chain groups and of cyclic groups. Unless otherwise specified, alkyl groups herein have up to 20 carbon atoms. Cyclic groups can be monocyclic or polycyclic and, in some embodiments, have from 3 to 10 ring carbon atoms. "Alkylene" is the divalent or multivalent form of "alkyl".

The phrase "interrupted by at least one functional group", for example, with regard to an alkyl, alkylene, or arylalkylene refers to having part of the alkyl, alkylene, or arylalkylene on both sides of the functional group. An example of an alkylene that is interrupted with -O- is $-CH_2-CH_2-O-CH_2-CH_2-$.

The term "aryl" as used herein includes carbocyclic aromatic rings or ring systems, for example, having 1, 2, or 3 rings, optionally containing at least one heteroatom (e.g., O, S, or N) in the ring, and optionally substituted by up to five substituents including one or more alkyl groups having up to 4 carbon atoms (e.g., methyl or ethyl), alkoxy having up to 4 carbon atoms, halo (i.e., fluoro, chloro, bromo or iodo), hydroxy, or nitro groups. Examples of aryl groups include phenyl, naphthyl, biphenyl, fluorenyl as