typical refractive indices of between 1.4 and 1.6. The transparent low-index gap **18** may comprise a vacuum gap or be filled with an optically transparent low-index gas material. For example air, nitrogen, helium, or argon all have a refractive index of between 1.0 and 1.1 and may be employed. Reflective electrode **12** is preferably made of metal (for example aluminum, silver, or magnesium) or metal alloys. Transparent electrode **16** is preferably made of transparent conductive materials, for example indium tin oxide (ITO) or other metal oxides. The organic material layers **14** may comprise organic materials known in the art, for example, hole-injection, hole-transport, light-emitting, electron-injection, and/or electron-transport layers. Such organic material layers are well known in the OLED art. The organic material layers typically have a refractive index of between 1.6 and 1.9, while indium tin oxide has a refractive index of approximately 1.8-2.1. Hence, the various layers **16** and **14** in the OLED have a refractive index range of 1.6 to 2.1. Of course, the refractive indices of various materials may be dependent on the wavelength of light passing through them, so the refractive index values cited here for these materials are only approximate. In any case, the transparent low-index gap **18** preferably has a refractive index lower than that of the organic materials, electrode materials, and cover at the desired wavelength for the OLED emitter. Scattering particles **70** of layer **22** preferably comprise material with a refractive index significantly greater than the transparent low-index gap **18**. Particles of higher index, comparable to the refractive index range of the various layers **16** and **14** in the OLED, are preferred to insure that all of the light trapped in the organic layers **14** and transparent electrode **16** can experience the direction altering effects of scattering layer **22**.

[**0040**] Whenever light crosses an interface between two layers of differing index (except for the case of total internal reflection), a portion of the light is reflected and another portion is refracted. Unwanted reflections can be reduced by the application of standard thin anti-reflection layers. Use of anti-reflection layers may be particularly useful on both sides of the encapsulating cover **20**. Means of preventing the encapsulating cover **20** from contacting the layers in a top-emitter OLED device may also be useful in the present invention. For example spacer particles located in the gap **18** to prevent the cover **20** from contacting the scattering layer **22** or OLED may be employed. Alternatively, raised non-light-emitting areas in the OLED may contact the cover **20** or layers formed on the cover **20**. It may also be advantageous to use light absorbing or light reflecting materials at these contact points in order to relax the alignment tolerances of the contact points. The scattering layer **22** may employ a variety of materials. For example, particles of SiN_x (x>1), Si_3N_4, TiO_2, MgO, ZnO may be employed. Titanium dioxide (e.g., refractive index of 2.5 to 3) particles may be particularly preferred. Shapes of refractive particles may be variable or random, cylindrical, rectangular, or spherical, but it is understood that the shape is not limited thereto. Use of variable shaped particles is particularly preferred to enhance random scattering of light over wide wavelength and angle distributions. A large difference in refractive indices between materials in the scattering layer **22** and the low-index gap is generally desired, and may be, for example, from 0.3 to 3. It is generally preferred to avoid diffractive effects in the scattering layer. Such effects may be avoided, for example, by locating features randomly or by ensuring that the sizes or distribution of the refractive elements are not the same as the wavelength of the color of light emitted by the device from the light-emitting area. It is preferred that the total diffuse transmittance of the scattering layer coated on a glass support should be high (preferably greater than 80%) and the absorption of the scattering layer should be as low as possible (preferably less than 5%, and ideally 0%).

[**0041**] Most OLED devices are sensitive to moisture or oxygen, or both, so they are commonly sealed, for example with a perimeter adhesive **60**, in an inert atmosphere such as nitrogen or argon, along with a desiccant such as alumina, bauxite, calcium sulfate, clays, silica gel, zeolites, alkaline metal oxides, alkaline earth metal oxides, sulfates, or metal halides and perchlorates. Methods for encapsulation and desiccation include, but are not limited to, those described in U.S. Pat. No. 6,226,890 issued May 8, 2001 to Boroson et al. In addition, barrier layers such as SiO_x (x>1), Teflon, and alternating inorganic/polymeric layers are known in the art for encapsulation.

[**0042**] As illustrated in FIG. **1**, a very thin protective layer **24** of transparent encapsulating materials may be deposited on the transparent electrode **16**. In this case, the scattering layer **22** may be deposited over the layers of encapsulating materials **24**. This structure has the advantage of protecting the electrode **16** during the deposition of the scattering layer **22**. Preferably, the layers of transparent encapsulating material **24** has a refractive index comparable to the refractive index range of the transparent electrode and organic layers, or is very thin (e.g., less than about 0.2 micron) so that wave guided light in the transparent electrode and organic layers will pass through the layers of transparent encapsulating material **24** and be scattered by the scattering layer **22**.

[**0043**] OLED devices of this invention can employ various well-known optical effects in order to enhance their properties if desired. This includes optimizing layer thicknesses to yield maximum light transmission, providing dielectric mirror structures, replacing reflective electrodes with light-absorbing electrodes, providing anti-glare or anti-reflection coatings over the display, providing a polarizing medium over the display, or providing colored, neutral density, or color conversion filters over the display. Filters, polarizers, and anti-glare or anti-reflection coatings may be specifically provided over the cover or as part of the cover. Color conversion materials may also be incorporated directly in a scattering layer, such as described in concurrently-filed, commonly-assigned, co-pending U.S. Ser. No. ______ (Kodak Docket No. 92206) and U.S. Ser. No. ______ (Kodak Docket No. 92015), the disclosures of which are incorporated herein by reference.

[**0044**] The present invention may also be practiced with either active- or passive-matrix OLED devices. It may also be employed in display devices or in area illumination devices. In a preferred embodiment, the present invention is employed in a flat-panel OLED device composed of small molecule or polymeric OLEDs as disclosed in but not limited to U.S. Pat. No. 4,769,292, issued Sep. 6, 1988 to Tang et al., and U.S. Pat. No. 5,061,569, issued Oct. 29, 1991 to VanSlyke et al. Many combinations and variations of organic light-emitting displays can be used to fabricate such a device, including both active- and passive-matrix OLED displays having either a top- or bottom-emitter architecture.