

Abstract of the Disclosure

PROCESS FOR MAKING AN ARRAY OF TAPERED PHOTOPOLYMERIZED WAVEGUIDES

The present invention is directed to a process for making an array of tapered photopolymerized waveguides. The tapered waveguides are useful as a display means in direct view devices and projection display devices.

In step (a), a photomask is placed in substantial contact with a substrate wherein the photomask has opaque and transparent regions. In step (b), a substantially uniform thickness of photopolymerizable mixture is placed on the substrate so that the substrate is positioned between the photopolymerizable mixture and the photomask wherein (i) the photopolymerizable mixture comprises at least one reactive monomer and photoinitiator and (ii) the photoinitiator is present in an amount sufficient to form a gradient of substantially collimated actinic radiation across the thickness of the photopolymerizable mixture during subsequent step (c). In step (c), while maintaining the photopolymerizable mixture and substrate in a substantially fixed plane relative to the substantially collimated actinic radiation, the photopolymerizable mixture is exposed through the transparent regions of the photomask to the substantially collimated actinic radiation for a time sufficient to form an array of tapered photopolymerized waveguides wherein (i) the tapered end of each of the waveguides extends outward from the substrate, (ii) each of the waveguides has a light input surface adjacent the substrate and a light output surface distal from the light input surface, and (iii) the area of the light input surface of each of the waveguides is greater than the area of its light output surface. In step (d), the photomask and photopolymerizable mixture which was not substantially polymerized by the substantially collimated actinic radiation during step (c) are removed from the substrate.

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