

ABSTRACT

A blank mask and the like are disclosed, which comprises a transparent substrate, a phase shift film, and a light shielding film. When the normal mode XRD analysis is performed on an upper surface of the phase shift, the phase shift film has the XRD maximum peak at 2θ of 15° to 30° . When normal mode XRD analysis is performed on a lower surface of the transparent substrate, the blank mask has the XRD maximum peak at 2θ of 15° to 30° . AI1 value of the blank mask expressed by Equation 1 below is 0.9 to 1.1.

[Equation 1]

$$AI1 = \frac{XM1}{XQ1}$$

where, the XM1 is maximum X-ray intensity value on the upper surface of the phase shift film by the normal mode XRD analysis. The XQ1 is maximum X-ray intensity value on the lower surface of the transparent substrate by the normal mode XRD analysis.

FIG 1