

[DOCUMENT] ABSTRACT

Provided is a mask blank including a phase shift film which has a function to transmit an exposure light of an ArF excimer laser at a predetermined transmittance and a function to generate a predetermined phase difference to the transmitting exposure light of an ArF excimer laser, and with a reduced back surface reflectance.

The phase shift film has a structure where a first layer, a second layer, and a third layer are stacked in this order from a side of the transparent substrate. Refractive indexes n_1 , n_2 , and n_3 of the first layer, the second layer, and the third layer, respectively, at a wavelength of an exposure light of an ArF excimer laser satisfy the relations of $n_1 > n_2$ and $n_2 < n_3$. Extinction coefficients k_1 , k_2 , and k_3 of the first layer, the second layer, and the third layer, respectively, at a wavelength of the exposure light satisfy the relations of $k_1 < k_2$ and $k_2 > k_3$. Film thicknesses d_1 , d_2 , and d_3 of the first layer, the second layer, and the third layer, respectively, satisfy relations of $d_1 < d_3$ and $d_2 < d_3$.