

[DOCUMENT] ABSTRACT

Provided is a mask blank, in which patterns with different transmittances can be formed with desired precision without causing complication in a mask manufacturing process, and in which a desired phase shift function can be obtained in each pattern.

A transmittance adjusting film is provided on a phase shift film; the phase shift film generates a phase difference of 150 degrees or more and 210 degrees or less between an ArF excimer laser exposure light transmitted through the phase shift film and the exposure light transmitted through the air for a same distance as a thickness of the phase shift film; and a refractive index n_U with respect to a wavelength of the exposure light, an extinction coefficient k_U with respect to the wavelength of the exposure light, and a thickness d_U [nm] of the transmittance adjusting film satisfy both equations (1) and (2) given below.

Equation (1) $d_U \leq -17.63 \times n_U^3 + 142.0 \times n_U^2 - 364.9 \times n_U + 315.8$

Equation (2) $d_U \geq -2.805 \times k_U^3 + 19.48 \times k_U^2 - 43.58 \times k_U + 38.11$