HALF-TONE PHASE SHIFT MASK BLANK AND METHOD FOR MANUFACTURING HALF-TONE PHASE SHIFT MASK

ABSTRACT

A half-tone phase shift film 2 and a light-shielding film 3 are stacked on transparent substrate 1. The light-shielding film 3 has a monolayer structure or a multilayer structure. At least one layer is formed by film-formation with a chromium-containing material including tin. The half-tone phase shift film 2 is made of a molybdenum silicon nitride oxide. The layer made of a chromium-containing material including tin can cause a significant increase in the etching rate at the time of chlorine-containing dry-etching including oxygen. Thus, burden on the resist pattern or hard mask pattern at the time of transferring a pattern on the light-shielding film is reduced, and therefore it is possible to carry out pattern transfer with high precision. The present invention provides a novel technique that can increase a dry-etching rate of a light-shielding film made of a chromium-containing material while assuring various characteristics required for the light-shielding film.

Fig. 1