

Title of Invention - PHOTOMASK BLANK AND METHOD FOR
MANUFACTURING PHOTOMASK

ABSTRACT

A photomask blank for removing a hard mask film and a mask manufacturing process. The photomask blank includes: a substrate; a patterning layer formed of a single or multiple layers; and a hard mask film. The hard mask film is made of a material containing chromium and at least one element selected from nitrogen, carbon, and oxygen, the hard mask film's density is 6.0 g/cm^3 or less, the hard mask film has resistance to dry-etching using a gas containing fluorine and not containing oxygen, and resistance to dry-etching using a gas containing chlorine and not containing oxygen, and the photomask blank satisfies the following formula (1): $d/v \leq 60 \text{ [min]}$ (1), wherein a film thickness reduction amount per minute of the hard mask film when processed with a sulfuric acid-hydrogen peroxide mixture is $v \text{ [nm/min]}$ and a film thickness of the hard mask film is $d \text{ [nm]}$.

[FIG. 1]