

Abstract

MASK BLANK, METHOD FOR MANUFACTURING TRANSFER MASK, AND METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE

Provided are a mask blank, a method for manufacturing a transfer mask, and a method for manufacturing a semiconductor device that are capable of suppressing occurrence of roughening of a surface of a transparent substrate and suppressing occurrence of spontaneous etching of a light shielding film pattern when EB defect repair is performed.

A mask blank includes a transparent substrate including a light shielding film for formation of a transfer pattern. The light shielding film is formed of a material containing silicon and nitrogen or a material containing one or more elements selected from a semimetal element and a non-metal element, and the light shielding film is provided in contact with a main surface of the transparent substrate, and has an optical density for exposure light of an ArF excimer laser of 2.5 or more. A ratio of a content (atom%) of silicon to a content (atom%) of nitrogen at an internal region except for a neighborhood region near an interface between the light shielding film and the transparent substrate and a surface layer region on a side opposite to the transparent substrate is 2.4 or more and 4.0 or less. The internal region has a total content of silicon and nitrogen of 97 atom% or more.

FIG. 1