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

ABSTRACT

Provided is a reflective mask blank capable of facilitating the discovery of contaminants, scratches and other critical defects by inhibiting the detection of pseudo defects attributable to surface roughness of a substrate or film in a defect inspection using a highly sensitive defect inspection apparatus. The reflective mask blank has a mask blank multilayer film comprising a multilayer reflective film, obtained by alternately laminating a high refractive index layer and a low refractive index layer, and an absorber film on a main surface of a mask blank substrate, wherein the root mean square roughness (Rms), obtained by measuring a 3 μm × 3 μm region on the surface of the reflective mask blank on which the mask blank multilayer film is formed with an atomic force microscope, is not more than 0.5 nm and the power spectrum density at a spatial frequency of 1 μm^{-1} to 10 μm^{-1} is not more than 50 nm^4.

Fig. 6