

Abstract

METHOD FOR STARTING UP FILM FORMING APPARATUS, METHOD FOR MANUFACTURING MASK BLANK, METHOD FOR MANUFACTURING TRANSFER MASK, AND METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE

[Problem] To provide a method for starting up a film forming apparatus including a target made of a material containing a transition metal and silicon and a shield in a film forming chamber; and a method for manufacturing a mask blank.

[Means for solving the problem] The method for starting up a film forming apparatus characterized in that it comprises the steps of:

introducing a noble gas and a reactive gas into the film forming chamber and forming a lower layer film on a surface of the shield by reactive sputtering, wherein the lower layer film is made of a material containing the transition metal, silicon, and elements derived from the reactive gas, and has indentation hardness of 5000MPa or more in accordance with a nanoindentation method; and

introducing a noble gas and a reactive gas into the film forming chamber and forming an upper layer film on the lower layer film on the shield by reactive sputtering, wherein the upper layer film is made of a material containing the transition metal, silicon, and elements derived from the reactive gas, and has indentation hardness of less than 5000MPa in accordance with the nanoindentation method.

[Selected Drawing] Fig. 1