Abstract

Since there are some cases where a CF film used as an interlayer dielectric film of a semiconductor device has a leak current which is too high to obtain required characteristics, it is required to decrease the leak current of the CF film.

Ar gas is used as a plasma producing gas, and a compound gas of C and F, e.g., C_4F_8 gas, a hydrocarbon gas, e.g., C_2H_4 gas, and a boron containing gas, e.g., BF_3 gas are used as thin film deposition gases. These gases are activated as plasma to deposit a CF film on a semiconductor wafer 10 using active species thereof. By adding the boron containing gas, boron is added to unreacted C and F and unbonded hands thereof which exist in the CF film, so that the number of the unbonded hands decreases. Therefore, it is difficult to form a current flowing path, so that the leak current decreases.