ABSTRACT

A high quality thermal oxide film is provided. For the purpose of the film, a cooling step is conducted after replacing an atmosphere in the diffusion furnace (1) with a high purity gas mixture of nitrogen N_2 99% and oxygen O_2 1% after an oxidizing and an annealing steps. Then, a pump (DP) is turned on to evacuate a load-lock chamber (6), which is then filled with nitrogen N_2. Then, while feeding a gas mixture of nitrogen N_2 99% and oxygen O_2 1% into the diffusion furnace (1), a wafer boat (3) is transferred from the diffusion furnace (1) to the load-lock chamber (6) (Removing step). Thus, the cooling and the removing steps are conducted under an atmosphere gas of a high purity mixture of nitrogen and a small amount of high purity oxygen free from impurities in the air. Only high purity oxygen is, therefore, introduced in an interface between a silicon substrate and an oxide film, so that a high quality thermal oxide film can be provided.