

Abstract

[Problem] To improve roughness when an SiO₂ film formed on a surface of a wafer is etched to a halfway position before a lower layer. [Solution] In order to etch an SiO₂ film 1 formed on a surface of a wafer W to a halfway position before a lower layer, the surface of the SiO₂ film 1 is irradiated with oxygen radicals 102 and is hydrophilizedm and subsequently, the SiO₂ film 1 is etched by using NH₃ gas and HF gas. Accordingly, NH₃ gas and HF gas can be evenly adsorbed to the surface of the SiO₂ film 1. Thus, the surface of the SiO₂ film 1 is uniformly etched, and even when the SiO₂ film 1 is etched to the halfway position before the lower layer, the irregularity (roughness) of the surface can be improved.