[ABSTRACT]

Described herein is a technique capable of improving electrical characteristics of a semiconductor device. According to the technique, there is provided a method of manufacturing a semiconductor device including: (a) generating oxygen and hydrogen active species; and (b) forming an oxide layer by supplying the oxygen and hydrogen active species to a substrate with a concave structure to subject a film on an inner surface of the concave structure to oxidation, wherein the oxide layer is formed in (b) such that a thickness of the oxide layer is greater on the inner surface than at an upper end portion of the concave structure by setting a ratio of a flow rate of the hydrogen active species to a total flow rate to a predetermined ratio greater than a first ratio at which a rate of forming the oxide layer is maximized at the upper end portion of the concave structure.