

ABSTRACT

The present disclosure provides a semiconductor device capable of improving element performance and reliability. The semiconductor device comprises a lower wiring structure, an upper interlayer insulating layer disposed on the lower wiring structure and including an upper wiring trench, the upper wiring trench exposing a portion of the lower wiring structure, and an upper wiring structure including an upper liner and an upper filling layer on the upper liner in the upper wiring trench, wherein the upper liner includes a sidewall portion extending along a sidewall of the upper wiring trench and a bottom portion extending along a bottom surface of the upper wiring trench, the sidewall portion of the upper liner includes cobalt (Co) and ruthenium (Ru), and the bottom portion of the upper liner is formed of cobalt (Co).

FIG. 4