METHODS FOR IMPROVING SHEET RESISTANCE OF SILICIDE LAYER AFTER REMOVAL OF ETCH STOP LAYER

Abstract

A method of manufacturing a semiconductor device is provided. A nickel silicide layer (e.g., NiSi) is formed on a substrate. Next, a hydrogen plasma treatment may be performed on the silicide layer, which may induce the formation of metal/silicon hydride bonds in the silicide layer. An etch stop layer is formed over the silicide layer. A dielectric layer is formed over the etch stop layer. An opening is formed in the dielectric layer. A portion of the etch stop layer is etched away at the opening to expose at least a portion of the silicide layer therebeneath. The etch chemistry mixture used during the etching step preferably includes hydrogen gas. The change in sheet resistance for the exposed silicide layer portion at the opening after the etching step, as compared to before the etching step, is preferably not greater than about 0.10 ohms/square.

FIG. 5