METHODS OF FORMING METAL INTERCONNECT STRUCTURES ON SEMICONDUCTOR SUBSTRATES USING OXYGEN-REMOVING PLASMAS AND INTERCONNECT STRUCTURES FORMED THEREBY

ABSTRACT

Methods of forming devices include forming a first electrically insulating layer having a metal interconnection therein, on a substrate and then forming a first electrically insulating barrier layer on an upper surface of the metal interconnection and on the first electrically insulating layer. The first electrically insulating barrier layer is exposed to a plasma that penetrates the first electrically insulating barrier and removes oxygen from an upper surface of the metal interconnection. The barrier layer may have a thickness in a range from about 5 Å to about 50 Å and the plasma may be a hydrogen-containing plasma that converts oxygen on the upper surface of the metal interconnection to water.

Figure 1