ABSTRACT

A PROCESS OF FORMING A COMPOSITE DIFFUSION BARRIER IN COPPER/ORGANIC LOW-K DAMASCENE TECHNOLOGY

A method of forming a composite barrier layer comprising the following steps. A substrate having a dielectric layer formed thereover is provided. An opening exposing a first portion of the substrate is formed within the dielectric layer. A dielectric flash layer is formed within the opening and over the first exposed portion of the substrate. The dielectric flash layer lines the opening. The bottommost horizontal portion of the dielectric flash layer is removed to expose a second portion of the substrate. An aluminum layer is formed over the etched dielectric flash layer and over the second exposed portion of the substrate. A barrier metal layer is formed over the aluminum layer. The etched dielectric flash layer, the aluminum layer and the barrier metal layer comprise the composite barrier layer. A planarized metal plug is formed within the barrier metal layer lined opening.

Fig. 10