CLAIMS

1. A semiconductor structure, comprising:

an interconnect structure within a dielectric layer, the interconnect structure comprising:

a barrier layer located on a bottom surface and sidewalls of the interconnect structure;

a first liner directly above the barrier layer, the first liner comprises ruthenium;

a second liner directly above the first liner, the second liner comprises cobalt;

a third liner above the second liner, the third liner comprising ruthenium, wherein migration of cobalt atoms from the second liner to the first liner and the third liner form a cobalt-infused ruthenium liner;

a conductive material above the cobalt-infused ruthenium liner substantially filling the interconnect structure; and

a capping layer directly above the conductive material, the capping layer comprises cobalt, wherein the cobalt-infused ruthenium liner reduces a concentration gradient between the capping layer and the cobalt-infused ruthenium liner for preventing diffusion of cobalt atoms from the capping layer.

2. The semiconductor structure of claim 1, wherein portions of the first liner, portions of the second liner, and portions of the third liner remain on sidewalls of the interconnect structure and a bottom portion of the interconnect structure is covered only by the barrier layer.

3. The semiconductor structure of claim 1, wherein a thickness of the second liner is less than a thickness of the first liner and the third liner.

4. The semiconductor structure of claim 1, wherein the conductive material comprises copper and the barrier layer comprises tantalum nitride.