Fragile Porous Low-k/Copper Integration by Using Electro-Chemical Polishing

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A fragile porous ultra-low-k(k=2.2) silica was integrated at trench level in damascene copper by applying previously reported Electro Chemical Polishing(ECP). After removing Cu by ECP, barrier(WN) was removed by Low-Pressure(LP)-CMP(<1psi). Practical polishing rates were obtained for WN in LP-CMP, because of higher chemical sensitivity of WN than Ta(N). Compatibility of CVD barrier to porous low-k, excellent barrier performance in aggressive features and lower via resistance were achieved by a newly developed CVD/PVD stacked WN barrier.