Ultrathin Ni-Mo-P Diffusion Barriers Deposited Using Nonisothermal Deposition Method in Acid Bath

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Abstract

The performance and thermal stability of the ultrathin nickel-molybdenum-phosphorus (Ni-Mo-P) barrier layer deposited by the nonisothermal deposition method in acid electroless bath have been clearly investigated. The as-deposited Ni-Mo-P film (15 nm) has a low resistivity, contains high amounts of Mo (6.7 atom %) and P (25 atom %), and has an amorphous structure. The barrier capability of this Ni-Mo-P film remains stable up to 650°C for 1 h annealing. This reveals that the resistance of Ni-Mo-P barrier film against Cu diffusion is very prominent, and this method for depositing Ni-Mo-P films is extremely promising for ultralargescale integration application.