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Effects of Stress and Void-Void Interactions on Current-Driven Void Surface Evolution in Metallic Thin Films JAESEOL CHO, M. RAUF GUNGOR, DIMITRIOS MAROUDAS, University of Massachusetts, Amherst — We report results of electromigration- and stress-induced migration and morphological evolution of voids in metallic thin films based on self-consistent numerical simulations. The analysis reveals the complex nature of void-void interactions and their implications for the evolution of metallic thin-film electrical resistance, providing interpretation for experimental measurements in interconnect lines. Interestingly, for two voids migrating in the same direction under certain conditions, we find that a smaller void does not always approach and coalesce with a larger one, while a larger void may approach and coalesce with a smaller one. In addition, we find that under certain electromechanical conditions, biaxially applied mechanical stress can cause substantial retardation of void motion, as measured by the constant speed of electromigration-induced translation of morphologically stable voids. This effect suggests the possibility for complete inhibition of current-driven void motion under stress.

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