A Novel Approach for Integration of Dual Metal Gate Process Using Ultra Thin Aluminum Nitride Buffer Layer

Chang Seo Park, Byung Jin Cho, Du An Yan[*], N. Balasubramanian[*], and Dim-Lee Kwong[**]
Silicon Nano Device Lab, Dept. of Electrical & Computer Engineering,
National University of Singapore, Singapore 119260
Tel: 65-6874-6470 Fax: 65-6779-1103 email: *elebjcho@nus.edu.sg*
[*]Institute of Microelectronics, Singapore 117685
[**]Department of Electrical and Computer Engineering, The University of Texas,
Austin, TX 78712, USA

We report a novel approach for dual metal gate process using an AlN_x buffer layer between metal and dielectric. The buffer layer protects the gate dielectric during metal etching process. During annealing, it is completely consumed and converted into a new metal alloy, resulting in no increase of EOT. The work functions of the original gate metals are modified as a result of the reaction, making this approach a solution for easy integration of dual metal gates.