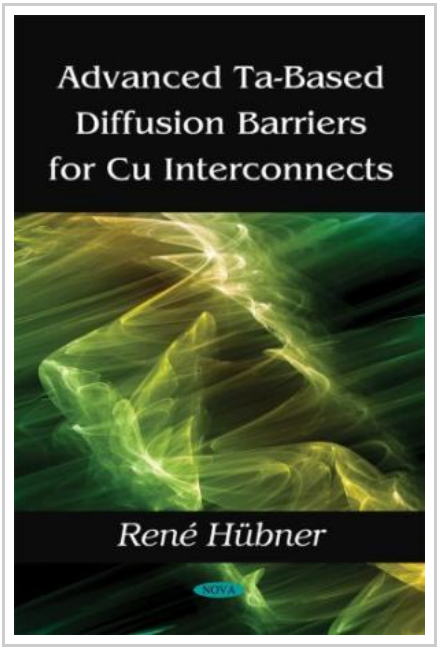

Advanced Ta-Based Diffusion Barriers for Cu Interconnects

By Rene Hubner

Nova Science Publishers Inc. Paperback. Book Condition: new. BRAND NEW, Advanced Ta-Based Diffusion Barriers for Cu Interconnects, Rene Hubner, During the last few years, copper has become the standard metallisation material for on-chip interconnects in high-performance microprocessors. Compared to the previously used aluminium, copper shows not only a lower resistivity, but also significantly improved electromigration resistance. Copper ions, however, are very mobile in silicon and many dielectric materials under electrical and thermal bias. Thus, barrier layers are needed to prevent Cu diffusion into the insulating layers surrounding the metallic interconnects. Since Ta-based compounds are characterized by a high thermal stability, pure Ta films or layer stacks consisting of Ta and TaN are used for such barriers. The continuous scaling down of the interconnect dimensions and, therefore, the essential decrease in the barrier layer thickness coupled with the replacement of silicon oxide by advanced low-k dielectrics demand further improvements of the diffusion barrier performance. It is the aim of this book to carry out microstructure and functional property investigations for advanced, high-performance Tabased diffusion barriers (Ta-TaN layer stacks and Ta-Si-N single layers) before and after annealing to compare their thermal stabilities and to probe the corresponding failure mechanisms. For the Ta-TaN...

Reviews

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