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Electrical and Mechanical Properties of Mesoporous Silica Thin Films

By Amit Pratap Singh

LAP Lambert Acad. Publ. Jan 2011, 2011. Taschenbuch. Book Condition: Neu. 220x150x8 mm. This item is printed on demand - Print on Demand Neuware - Mesoporous silica (MPS) thin films are attractive for application as low- interlayer dielectric (ILD) in integrated circuits. However these films are susceptible to instabilities in electrical behavior due to water uptake and copper diffusion. This work discusses the electrical, chemical, and thermal instabilities, Cu diffusion, and adhesion of these materials for evaluating and enabling their use for applications as future ILD in device wiring. Thermal stability of functional groups and adhesion of these films with Cu are also key questions for integration of these dielectrics into real devices. We do try to address these questions here for few type of functional MPS films. Pore structure is another key parameter in defining mechanical and electrical performance of MPS films. In this work we used MPS films with 3D-Cubic pores for most of the studies. Differences in properties of MPS films with pores oriented parallel to substrate (2D-hexagonal) and MPS films with cubic fashion (3D-cubic) pores are discussed towards the end. In summary, this work shows ways to tailor electrical and mechanical properties of MPS low-dielectrics...



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