Abstract Submitted
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Trap densities in porous low-k dielectric thin films as determined by optical and electrical measurements[1] JOANNA ATKIN, DAOHUA SONG, ROBERT LAIBOWITZ, Columbia University, EDUARD CARTIER, THOMAS SHAW, IBM Yorktown Heights, TONY HEINZ, Columbia University — Low-k dielectric materials based on porous carbon-doped oxides (p-CDOs), with relative dielectric constants as low as k = 2.1, are of great interest in the microelectronics industry. Knowledge of their basic electronic properties, such as energy gaps, barrier heights, and trap states, is essential for developing an understanding of their electrical leakage and stability characteristics. In particular, conduction via trap states is known to be an important mechanism for charge transport. We present measurements of the density of trap states in low-k p-CDO films deposited on silicon. The techniques used include photoinduced current transients, optical second-harmonic generation measurements, and C-V electrical characterization. The low-k materials are shown to have relatively high trap densities (as compared with silicon dioxide films). The different behavior of bulk and interface traps will be discussed, along with the effects of annealing in various ambients.

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