

In-situ TEM Study by PicoIndenter

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In current study, a TEM PicoIndenter from Hysitron, Inc. was integrated into the transmission electron microscope (TEM). The combination of the PicoIndenter holder and TEM is proved to have versatile applications and advantages. The time-dependent dielectric breakdown (TDDB) kinetics in copper/low-k on-chip interconnect structures was studied by in-situ TEM imaging and electron spectroscopic imaging (ESI) techniques. An experimental methodology with the help of the PicoIndenter was developed to observe the Cu diffusion in porous low-k materials and the failure mechanism of the interconnect structures as a function of time. Another ongoing fascinating application of the PicoIndenter is introducing strain/stress on mono/multi-layer graphene quantitatively. In this study, the high resolution TEM imaging technique, electrical test and valence electron energy loss spectroscopy would be used to investigate the change of the atomic structure and band gap for the strained graphene nanoribbon and functionalized graphene.