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Supercritical Fluid Technology for Interconnect Fabrication

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Supercritical fluids (SCFs) offer a unique technology platform for semiconductor devices. The absence of surface tension, favorable transport properties and densities that approach those of liquids provide a means for solution-based processes in an environment that behaves much like a gas. These attributes are ideally suited for executing materials chemistries within the smallest device features. This talk will describe the motivation for SCF-based processes and survey potential applications including the deposition of metals including Cu, Ru, and Co, and the etching of metal oxides. Particular attention will be paid to the rapid and efficient preparation of ordered, mesoporous ultra-low dielectric constant (ULK) organosilicate films by the three dimensional replication of structured organic templates in supercritical carbon dioxide. These ULK films are sufficiently robust to survive CMP.