ABSTRACT

LASER CURING OF SPIN-ON DIELECTRIC THIN FILMS

A process for curing low-k spin-on dielectric layers based on alkyl silsesquioxane polymers by laser scanning is described wherein curing is achieved by both photothermal and photochemical mechanisms. The layers are deposited by spin deposition, dried and cured by raster scanning with a pulsed laser at energies between 0.1 and 1 Joules/cm^2. Because the laser causes heating of the layer, a nitrogen jet is applied in the wake of the scanning laser beam to rapidly cool the layer and to inhibit oxidation and moisture absorption. The laser induced heating also assists in the discharge of moisture and by-products of the polymerization process. The laser operates at wavelengths between 200 and 400 nm. Insulative layers such as silicon oxide are sufficiently transparent at these so that oxide segments overlying the polymer layer do not inhibit the curing process. Implementation of the laser scanning feature is readily incorporated into an existing spin-on deposition and curing tool.

(FIGURE 1A IS SUGGESTED FOR PUBLICATION)