

innovations

from The University of Vermont

TITLE: PLASMA ENHANCED CVD PROCESS FOR RAPIDLY GROWING SEMICONDUCTOR FILMS

INVENTOR: Walter Varhue

DESCRIPTION: The invention relates to the epitaxial growth of semiconductor films and in particular to the rapid growth of silicon-based and germanium-based films. The deposition of appropriate materials on silicon or germanium wafers can be achieved at low substrate temperatures, i.e. below 650°C, and at high deposition rates, i.e., greater than 150 Å/minute, and as high as 500 Å/minute. The deposition process is assisted by a gaseous discharge, which acts to increase the deposition rate and to reduce the required substrate temperature. An exemplary gas discharge is an electron cyclotron resonance plasma, but this process in practice is not limited to such, and is extendable to other known plasma generating mechanisms, such as transformer coupled, inductively coupled, helicon, helical resonator, and remote or magnetically enhanced RF processes where energetic ion bombardment of the substrate surface is possible.

ADVANTAGES: This technology represents a breakthrough in the silicon production process by significantly reducing production temperature, while dramatically increasing growth rate. The process has been validated in Dr. Varhue's laboratory.

PATENT STATUS: US Patent applied for 9/14/99

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