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Technology for the Microwave Solid State Devices of the 80's: Molecules, Electrons and Ions

Circuit, system and device designers, encouraged by the success of the past ten years, are conspiring to accelerate the pace of device development. What they want is improved performance, higher levels of integration, more uniformity, better reliability, and lower cost. Getting there will require a new generation of semiconductor technologies. Traditional methods of materials growth may need to be replaced by the tailoring of materials on a molecule by molecule basis; device structures may be fabricated using ion implantation and laser annealing, eliminating furnace operations; wet etching of devices may be replaced by dry plasma and ion etching; optical exposure of photo-resists may be replaced by exposure to electrons or x-rays; and masks may be eliminated by direct exposure of wafers.

In this paper, I will describe new technologies in use in the laboratory which may revolutionize semiconductor fabrication. I will discuss equipment and techniques, ranges of application and the impact on performance and cost. My intent is to provide the circuit and system designer with insight into the technologies from which the next generation of devices will arise.