

Rump Session

Three Dimensional Integration

VLSI will be reaching to the limit of minimization in 1990's, and after that the further increase of packing density or functions might depend on the vertical integration technology.

3-D integration is expected to provide several advantages;

- (1) Parallel processing
- (2) High speed operation
- (3) High packing density
- (4) Multi-functional operation

The research stage of 3-D is very primitive now. The control of crystal quality of SOI, stacking technology of active layers and various kinds of recrystallization techniques are proposed.

Some basic functional models of 3-D devices are fabricated in a small scale integration in 2 to 3 stacked active layers.

All these activities and fundamental works are reviewed together with a stimulated discussion on the devices, systems, and the merits which future 3-D devices can be applied.

R-C

Photochemical Processing for Solid State Devices

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Next generation VLSI fabrication technology beyond 4 Mbit dRAM will need some of innovative processes which can promote silent chemical reactions at low temperatures. Photochemical process would be a possible candidate to meet this demand. Extensive studies on etching, CVD, epitaxy, photo-mask repair, doping, oxidation and nitridation, and lithography have currently been carried out and have revealed the potential of this technology. The capability of anisotropic etching of silicon, SiO₂ and metals with high rates and selective deposition of thin films must be most important in order to utilize the photochemical processing as a next generation VLSI process. However, fundamental understanding of the chemistry involved in such novel photo-processes has not yet been well settled. In this session the following subjects will be covered:

1. Recent developments in photochemical processes such as etching, CVD, nitridation and oxidation, and epitaxy.
2. Diagnostic tools of understanding photochemical reactions on surfaces.
3. How to promote anisotropic etching and selective deposition, and whether or not the photochemical processes can be used to fabricate submicron devices.