R&D 100 WINNER

1999 R&D 100 Awards Winner
REED-MD: A Computer Code for Predicting Dopant Density Profiles in Semiconductor Wafers

Features

REED-MD is a computer code that accurately and efficiently predicts dopant density profiles in ion-implanted semiconductor wafers. Optimal semiconductor device performance depends on the careful control of these profiles which, until now, has required lengthy, expensive trial-and-error experiments. By simulating the paths of thousands of ions, REED-MD produces profiles more quickly and cheaply than those obtained from experiments. And the quality of REED-MD's profiles rivals or exceeds that obtained experimentally. The code also has high accuracy for values of implant parameters that produce profiles difficult or impossible to measure experimentally.

Applications

REED-MD is currently used primarily by Motorola, but IBM and Intel are also emerging as serious users of the code. REED-MD can be used to

- explore new combinations of implant ions and semiconductor targets,
- study existing ion/target combinations at very low ion implant energies,
- study the effects on implantation of amorphous or oxide-coated surfaces,
- explore new implantation methods, and
- validate dopant density profiles obtained experimentally.

Benefits

REED-MD's speed, accuracy, flexibility, and cost-effectiveness provide unprecedented power to explore new designs for semiconductor devices. It not only identifies useful ion/target combinations quickly and cost-effectively but also obtains dopant density profiles at the low ion energies for which it is difficult to obtain useful measurements. REED-MD will provide the profile data needed for the semiconductor industry to develop the next generation of faster microelectronic devices.