



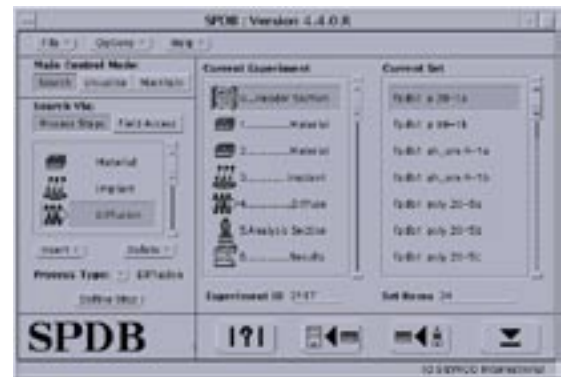
# SPDB

## Silvaco's Process Database

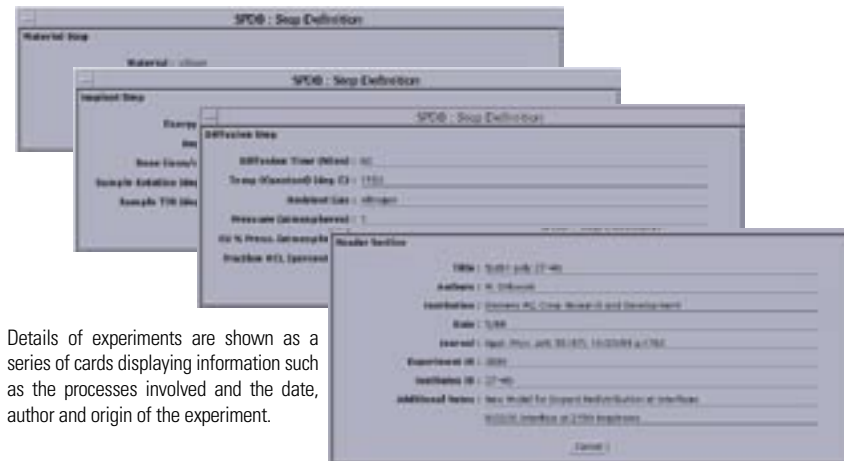
SPDB is a comprehensive, high speed database manager designed to contain experimental and simulated doping profiles and recipes. With a user-friendly graphical user interface, it provides easy access to a wide range of experimental profiles. With over 6000 profiles gathered from leading worldwide sources, SPDB is the largest semiconductor process database commercially available. A user's own profiles may be added and maintained within SPDB. User-defined or SILVACO supplied doping profiles are used as optimization targets for effective process simulator calibration.

## Applications

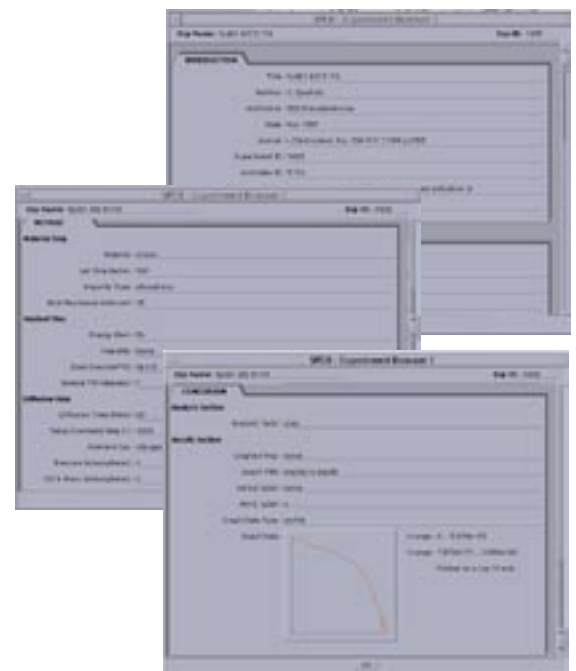
- Calibrate your process simulator by using Optimizer to fit simulation results to experimental data
- Maintain your own profiles within SPDB in an open ASCII format
- Export SIMS profiles to process and device simulators and DevEdit
- Investigate novel process technologies including silicides, RTA, and implant species such as aluminum, germanium and antimony
- Generate experimental matrices of time, temperature, dose and energy



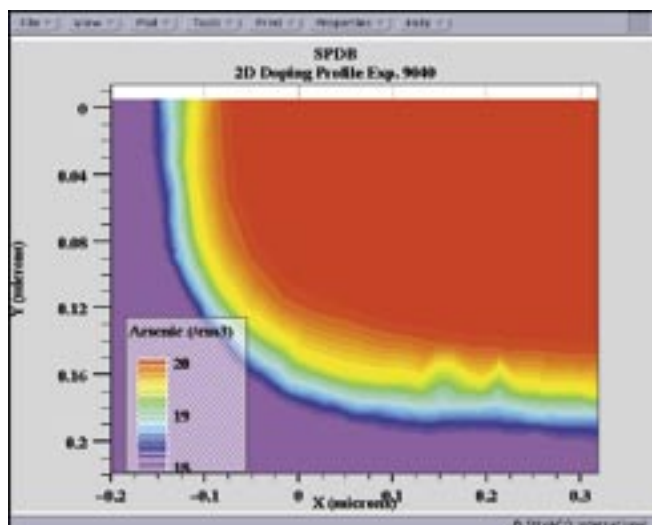
The main screen is used to control searches, show the resulting set of matching experiments, and the composition of experiments.



Details of experiments are shown as a series of cards displaying information such as the processes involved and the date, author and origin of the experiment.



The SPDB Experiment Browser is used for convenient visualization of detailed information about the current experiment, including authors, publication source and date, all process steps, as well as analysis method (e.g. SIMS, SRP) and profile image.



Lateral diffusion may be examined with SPDB's two-dimensional profiles. Contours of arsenic are shown after a high dose implant and diffusion.

## Features

- Large and growing data set
- High speed indexed search
- ASCII import for fast SPDB data entry
- ASCII export to third party software
- Interface to the Optimizer
- Over 100 possible search fields
- Multi-user access
- Networked database architecture
- Facilities to load and save intermediate search results
- Object oriented design for improved reliability
- Interactive graphics
- Presentation quality hard copy output
- Extensive range of printers supported
- Full color online help

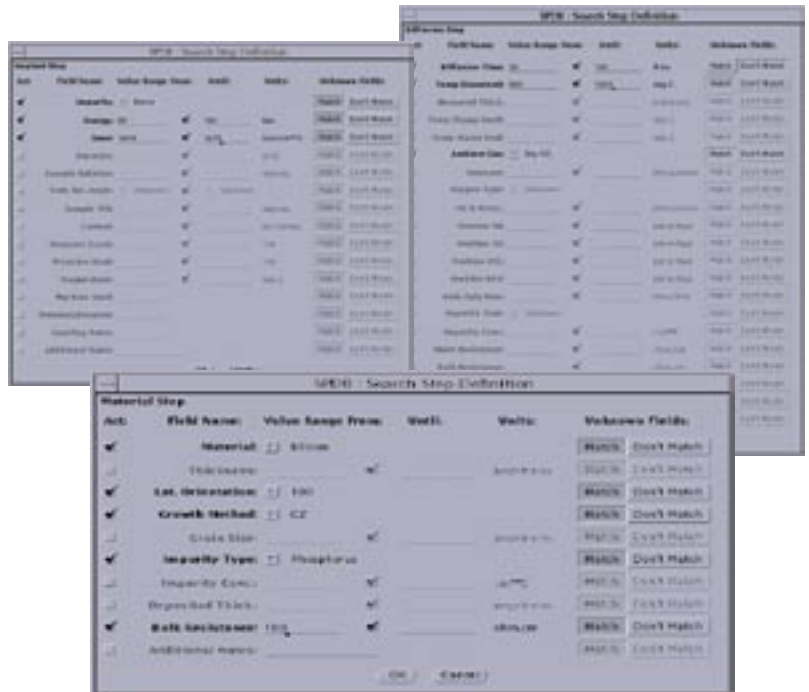
## Data

- Collected from a large number of industrial companies and research institutes worldwide
- Records contain a set of experimental conditions and related profiles
- All measurement techniques supported such as SIMS, SRP and Hall methods
- Supports 1D and 2D profiles

## Profiles

- 6000 profiles in total
- 3200 boron profiles
- 1000 arsenic profiles
- 800 phosphorus profiles
- 500 BF<sub>2</sub> profiles
- 250 germanium profiles
- 200 silicide profiles
- Over 50 2D profiles
- Many novel implant species including aluminum, antimony, BF<sub>3</sub>, BCL gallium and inert gases

## Multiple Process Steps Search



One way to perform a search in SPDB is to define a series of process steps. In this example the search was for experiments with an implant of boron at a dose of  $1e15$  ions/cm<sup>2</sup> and 60KeV implant energy into a silicon substrate. It was required that the implant be followed by a diffusion at a temperature of between 900 and 1000 degrees Centigrade for a period of 20 minutes. From the results of the implant and diffusion search three profiles were chosen.

The comparison is shown in the picture below.

