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Editors: Thomas O. Sedgwick, Thomas E. Seidel and Bor-Yeu Tsaur

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## Rapid Thermal Processing

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## Preface

The Symposium on Rapid Thermal Processing (RTP), Symposium B, at the 1985 Fall Meeting in Boston, became a dynamic and growing offspring of Symposium A. Symposium B brought together research activities ranging over a variety of materials and processes. All the thermal processors used broad area heat sources to anneal and process materials over relatively large areas (100 square centimeters) and for short times (seconds). Interest in Rapid Thermal Processing has been fostered from its inception by the Materials Research Society. It has grown dramatically from just a few papers in 1981 to a full-fledged independent symposium at this Fall Meeting with 59 invited and contributed papers.

The materials were, of course, the focus of the two and one-half day symposium. Silicon and silicon transistor technology dominated with its host of associated materials: oxides, nitrides, silicides and reflow glasses. The session on compound semiconductors was dominated by GaAs and related III-V materials. Quite remarkably, rapid annealing which started a few years ago as an outgrowth of laser annealing for ion implant damage removal, has now grown to include "processes" with reactive gases. This includes rather extensive studies of the oxidation of silicon and the nitridation of oxides. Now, first reported at this meeting, RTP has been used to grow epitaxial silicon. All these activities show the vigor with which investigators are expanding the range of applications. This technique may in fact herald the introduction of RTP "style" processing equipment to carry out a wide range of semiconductor fabrication steps. As the move toward larger wafer sizes continues and if single-wafer-processing becomes pervasive, it would seem likely that many device fabrication steps will be carried out in equipment of the rapid thermal processing type. RTP can minimize thermal cycle, provide rapid process turn around and is single-wafer-processing compatible.

Most of the papers presented at the symposium have been brought together in this volume to form a permanent record. We hope this volume will be useful to all those interested in this rapidly growing and evolving technology.

Symposium Co-chairmen

T.O. Sedgwick

T.E. Seidel

B-Y. Tsaur

Acknowledgments

We wish to thank all the contributors and participants who made the symposium so successful. We would like to acknowledge the invited speakers whose talks set the tone for the meeting. They are:

|                |              |
|----------------|--------------|
| F.M. d'Heurle  | D.M. Maher   |
| A.E. Michel    | S.J. Pearton |
| S.J. Pennycook | S. Shatas    |
| S.R. Wilson    | P.K. Vasudev |

We would also like to acknowledge the contributions made by the panelists for the Tuesday evening panel and rump session. The focus of the discussion was the question "Where Will Rapid Thermal Processing Be Required For VLSI Processing". The panel was moderated by T.E. Seidel and summary comments were made by T.O. Sedgwick. The panelists were:

|               |              |
|---------------|--------------|
| J. C. Gelpey  | C. Russo     |
| P. K. Vasudev | S. Shatas    |
| S. Prussin    | S. K. Behera |

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|              |                |
|--------------|----------------|
| T. E. Seidel | T. O. Sedgwick |
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| B-Y. Tsaaur  | D. J. Lischner |
| F.M d'Heurle | J. Nulman      |
| D. E. Davies | H. J. Hovel    |

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