

## Special Section on Porous Silicon

### FOREWORD

Recent observation of visible photoluminescence from porous silicon has evoked wide interest in this material. Currently it is one of the most intensively investigated materials due to its potential as a building block in optoelectronics.

Porous silicon was first obtained in 1956 by Uhlir who observed a coloured film while developing an electropolishing technique for silicon. Some interest in porous silicon (PS) persisted due to its potential application for isolation in integrated circuits particularly silicon-on-insulator (SOI) technology. Although photoluminescence from PS was first reported in 1984 it was only after Canham's report in 1990 that wide interest has been triggered. Despite wide ranging investigations of its properties, consistent explanations for various observations including photoluminescence have remained elusive. Its formation chemistry including the resistance of the walls between pores to further chemical attack remains a mystery. Several attempts have also been made to fabricate electroluminescent structures.

There are five invited papers in this issue dealing with different aspects of porous silicon. These papers represent the trend of research in this field in India and report new technologies and new characterization techniques that have been tried to understand this material. It seems that porous silicon is a 'dirty' system with a large variety of microstructures and surface chemistries. Attempts to combine the basic ideas like quantum size effects and surface compounds to evolve hybrid models are already under way. It is expected that future studies of optical transitions, electron injection and transport, band structure and surface chemistry will help in our understanding the material. The electroluminescent diode seems promising and may be available before we begin to understand photoluminescence, let alone electroluminescence. We expect intensive studies—theoretical and experimental—of this material in the years to come.

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