

Special Issue on Physical Chemistry of Wet Etching of Silicon

Preface

The chemical anisotropic etching of single crystals, particularly silicon, is widely used in the fabrication of micron-sized mechanical systems, i.e., MEMS, microsystems, and micromachines. Though this process has long been utilized industrially for many practical applications, researchers have observed a number of phenomena that are not explained by existing etching models, and have been encountering difficulties with process control. Etching models that argue for anisotropy in etching on the basis of the number of dangling bonds of surface atoms, are not yet sufficient for describing real phenomena. The change in morphology of the etched surface, that is related to a change in anisotropy due to the presence of a small amount of additives or impurities in etchant, has not yet been clarified. There is a wide scope for research into anisotropic etching; i.e., on aspects such as the etching model, process simulation, characterization, micromachining technologies, process design and fabrication. It is important that such research be undertaken in a variety of fields such as physics, chemistry, electrochemistry, and end users working with the etching systems.

A biannual workshop titled the Physical Chemistry of Wet Etching of Silicon was initiated in 1998, to respond to the above described demands. Professor M. Elwenspoek of the University of Twente chaired the first workshop, held in Holten, the Netherlands. The second was held in Toulouse, France, in 2000. It was chaired by Dr. H. Camon of LAAS/CNRS. I myself was honored to host the third workshop, held on June 4–6, 2002, in Nara.

The workshop has so far been small in size, but has been successful in organizing programs that have allowed for focused discussions among interdisciplinary attendees, as well as in enhancing international communications in this field. The third workshop involved 17 papers, including three invited talks.

This special issue focuses on this most recent workshop, and presents selected papers in full from the workshop. I would like to address my gratitude to the Chief Editor, Professor S. Sugiyama, for providing the opportunity to publish the results of this workshop. Thanks are also due to A. Oka and T. Inaba of MYU K.K., for their continuous support.

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