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Evolution of Surface Roughness in KOH Etching of Silicon Caused by Material Defects

Eero Haimi and Veikko K. Lindroos

Laboratory of Physical Metallurgy and Materials Science
Helsinki University of Technology, P.O.Box 6200, 02015 HUT, Finland

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In the absence of pyramidal hillocks, a typical (100) surface morphology of KOH etched silicon builds up from shallow pits. Recently, contradictory experimental results have been reported on the role of thermal history and oxygen concentration of silicon on surface roughness. In the present work, the evolution of the (100) surface roughness in KOH etching of silicon has been studied in order to clarify the origin of the roughness. In the experiments, bulk microdefect density of p+-type silicon wafers was measured and, thereafter, the wafers were etched using different etching times. Comparison of the results supports the idea that material defects act as sources of etching defects on the (100) silicon surface.