

## Silicon Wet Etch Anisotropy: Analysis of the Impact of {111}-, {110}-, {100}- Terrace Widths

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A step-based model of wet anisotropic etching of silicon is examined in conjunction with observations from wagon-wheel under-etch experiments of Si{100} and Si{110} in tetra-methyl ammonium hydroxide (TMAH) at 25 wt% at 80°C. Stepped surfaces may be composed of flat {111} terraces, and/or flat {100} or {110} terraces. Transitions (crossovers) between terrace orientations are theoretically analyzed and found to be approximately {331} and {311} planes, respectively. These crossover planes occur at several deviation angles and underetched facets. The theoretical crossovers are compared to experimental observations regarding transitions in facet configuration, roughness, and etch rate. These crossovers may significantly influence the complexity of etch rate variation and facet appearance or disappearance in an underetch experiment.

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