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Vertical Wall Cavity on (100) Silicon Processed by Concentrated NaOH solution agitated with ultrasonic coupled with Mechanical Rotation

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This work aims to evaluate the use of concentrated sodium hydroxide solution to etch silicon (100) substrate under solution agitation by ultrasonic coupled with mechanical rotation for achieving vertical etched sidewall. Experimental trials were conducted by design of experiments with full factorial design. Factors considered here compose of; sodium hydroxide concentration, solution temperature and substrate rotation speed with the setting value in the range of 15-45%wt, 40-60℃ and 3-15 rpm, respectively. Etched wall angle and etch rate were considered as response which targeting vertical wall and maximum etch rate. Experimental results provide etching recipe that provide vertical wall and highest etch rate by setting etching condition as NaOH concentrated at 45%wt, solution temperature at 60℃ and 3 rpm substrate rotation speed. The etched surface is smooth possess the roughness at 33.66 nm.

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