

Materials Science Forum, vol. 857, 2016, pages 151-155

International Conference on Advanced Materials Engineering and Technology, ICAMET 2015; Kaohsiung; Taiwan; 4 December 2015 through 5 December 2015; Code 171779

## **Response surface methodology (RSM) in fabrication of nanostructured silicon**

### **Abstract**

In this paper, a response surface methodology (RSM) model has been developed using three levels Box-Benken experimental design (BBD) technique to study the influence of several metal-assisted chemical etching (MACE) process variables on the properties of nanostructured silicon (Si) wafer. Five process variables are examined i.e. concentrations of silver (Ag), hydrofluoric acid (HF), deposition time, H<sub>2</sub>O<sub>2</sub> concentration and etching time as a function of etching rate. Design-Expert® software (version 7.1) is used in formulating the RSM model of five factors with 46 experiments. A regression quadratic model is developed to correlate the process variables where the most significant factors are identified and validated using analysis of variance (ANOVA). The model for etching rate is found to be significant with R<sup>2</sup> of 0.8, where both Ag concentrations and etching time are the major influence.

### **Keywords**

Box-behnken design; DoE; MACE; RSM; Si nanostructures