Effects of Selective Film Thickness on Sensitivity of Microcantilever Hydrogen and Mercury Sensors

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Microcantilevers coated with thin films of metals and alloys can be made into very sensitive chemo-mechanical sensors. We have developed highly sensitive hydrogen and mercury sensors by coating the cantilevers with thin films of Pd, Pd-Ag, and Au. We have investigated the detection sensitivity of these devices as a function of film thickness. Both theoretical and experimental results indicate the existence of coating thickness optimal for detection sensitivity and response time. The performances of optical and electrical detection methods will be presented. The effects of environmental influences such as relative humidity and ambient temperature on the sensor performance will be addressed.

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