World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:12, No:11, 2018

Highly Sensitive and Selective H2 Gas Sensor Based on Pd-Pt Decorated Nanostructured Silicon Carbide Thin Films for Extreme Environment Application

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Abstract : Present work describes the fabrication and sensing characteristics of the Pd-Pt decorated nanostructured silicon carbide (SiC) thin films on anodized porous silicon (PSi) substrate by RF magnetron sputtering. The gas sensing performance of Pd-Pt/SiC/PSi sensing electrode towards H2 gas under low (10–400 ppm) detection limit and high operating temperature regime (25–600 °C) were studied in detail. The chemiresistive sensor exhibited high selectivity, good sensing response, fast response/recovery time with excellent stability towards H2 at high temperature. The selectivity measurement of the sensing electrode was done towards different oxidizing and reducing gases and proposed sensing mechanism discussed in detail. Therefore, the investigated Pd-Pt/SiC/PSi structure may be a highly sensitive and selective hydrogen gas sensing electrode for deployment in extreme environment applications.

Keywords : RF Sputtering, silicon carbide, porous silicon, hydrogen gas sensor
Conference Title : ICSST 2018 : International Conference on Sensor Science and Technology
Conference Location : Dubai, United Arab Emirates
Conference Dates : November 19-20, 2018