Noble Au-functionalized WS_2 nanosheetsgas sensors

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WS_2 is a promising 2D materialfor sensing applications thanks to high surface area and excellent electricalproperties. However for sufficient sensing applications its sensitivity needsto be improved more. A good strategy for that purpose is to functionalize with noblemetal nanoparticles (NPs). NPs can make additional charge depletion zone in WS_2nanosheets, thereby amplifying their resistance modulation during interactionwith gas molecules. Furthermore, NPs can provide a spillover effect;facilitating adsorption, dissociation, and transfer of target gases to WS_2nanosheets surface. This can lead to improved sensitivity towards a specificgas. In this study, we functionalized noble Au NPs on the surfaces of WS_2nanosheets. A solution containing WS_2 nanosheets was drop cast onthe SiO_2 wafer, and then Au NPs were prepared by using UVirradiation. Eariler studies have confirmed that Au NPs exhibit excellentselective behavior to CO gas. Therefore, the performance of the Au-functionalizedWS_2 sensor was verified by measuring CO in comparison to variousreducing gases such as C_6H_6 and C_7H_8.In the study, the 2D sensors were systematically investigated in terms of gasresponse, selectivity and power consumption.