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Integration of Scpi over Vxi-11 Protocols in an Automated Gas Sensing Measurement System

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Abstract

Gas sensing plays a crucial role in numerous applications, such as environmental monitoring, industrial safety, and healthcare. Semiconductor oxide nanostructured sensors have emerged as promising candidates due to their high sensitivity and low cost. However, the accurate and efficient characterization of their gas sensing properties remains a challenge. In this article, we present an automated measurement system that combines a source meter device for executing measurements and a software platform for user interface, signal visualization, and data storage. The system enables both transient measurements in time and volt-ampere characteristics measurements of the sensors. The software platform provides a user-friendly interface for configuring measurement parameters, initiating measurements, and visualizing real-time sensor responses. The acquired data is processed, analyzed, and stored in the network file storage for further examination. A comparison with existing systems based on LabVIEW or MATLAB highlights the advantages of the proposed measurement system, such as improved flexibility, scalability, and ease of integration with different source meter devices. The system's modular architecture opens the way for advanced data analysis and modeling. Our approach enhances the speed, reliability, and repeatability of gas sensing characterization. The described measurement system offers researchers an effective and customizable tool for gas sensing analysis, facilitating scientific advancements in this field.

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Keywords: gas sensing, semiconductor oxide sensors, automated measurement systems, sensor characteristics data

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