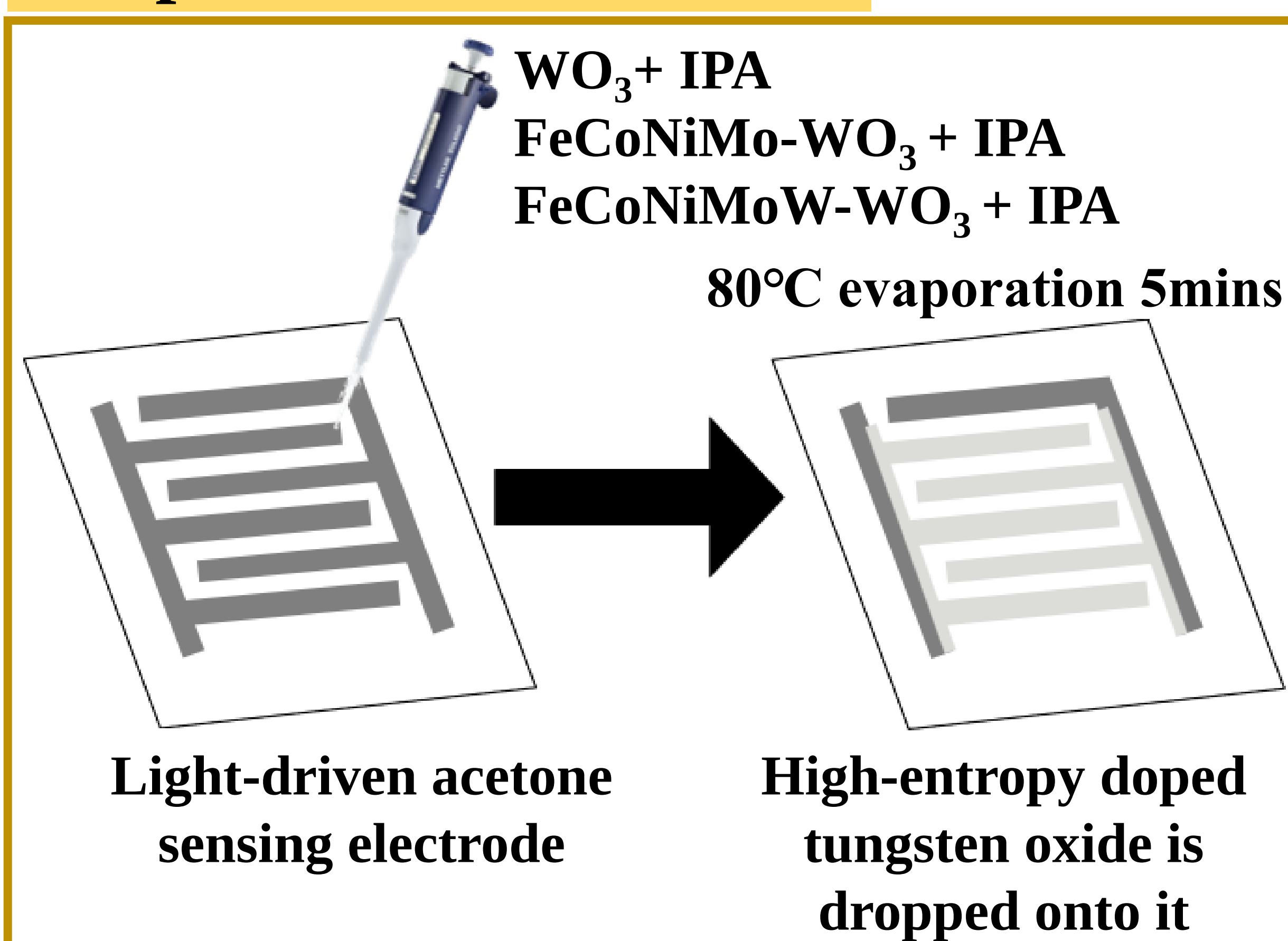


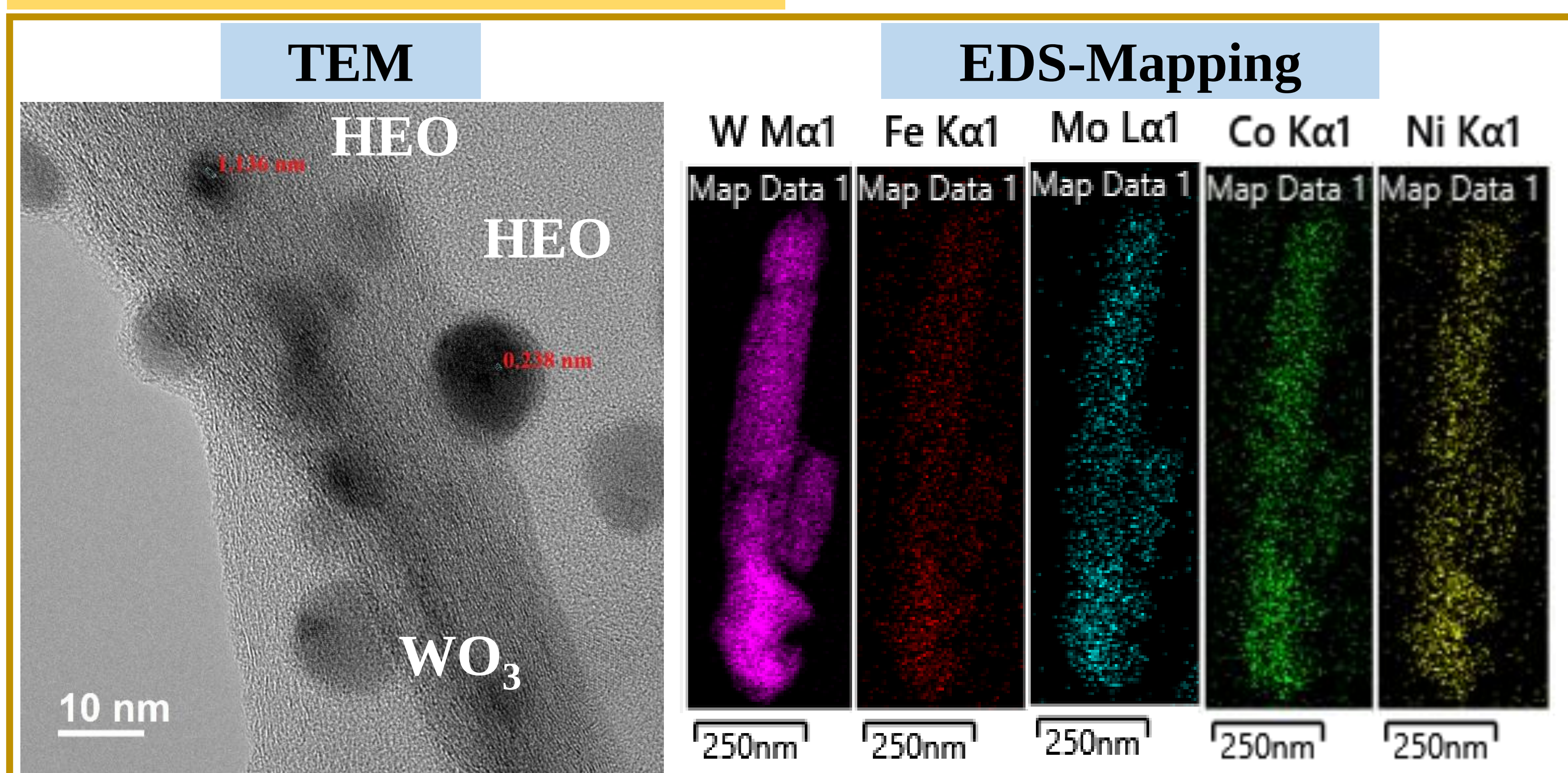
Abstract

High-entropy materials, as emerging advanced functional materials, have shown great potential in the field of sensing technology in recent years. This study focuses on the application of multifunctional high-entropy photocatalysts in sensors and develops gas-phase sensing technology for volatile organic compounds (VOCs). This study synthesizing high-entropy materials and oxides by a CTAB (C₁₉H₄₂BrN)-assisted non-hydro sol-gel method and the sensor developed in this study, used for detecting changes in resistance in the gas phase, involves adding high-entropy powder to isopropanol (IPA), stirring, drop-coating it onto an electrode substrate, connecting it to a sensing instrument, and then performing variable modulation and analysis. The FeCoNiMo-WO₃ and FeCoNiMoW-WO₃ composite sensor exhibited enhanced acetone sensing performance, achieving significant response toward 10~1000 ppm acetone with excellent concentration sensitivity, stability, temperature control and selectivity over other VOCs sensor. The synergistic effect of high-entropy nanoparticles improved the catalytic activity and gas-sensing properties of WO₃, demonstrating its potential as a low-cost, highly sensitive material for non-invasive disease diagnosis. This study shows that WO₃ modified with high-entropy materials exhibit excellent repeatability and sensitivity for non-invasive disease diagnosis and industrial gas-sensing applications.

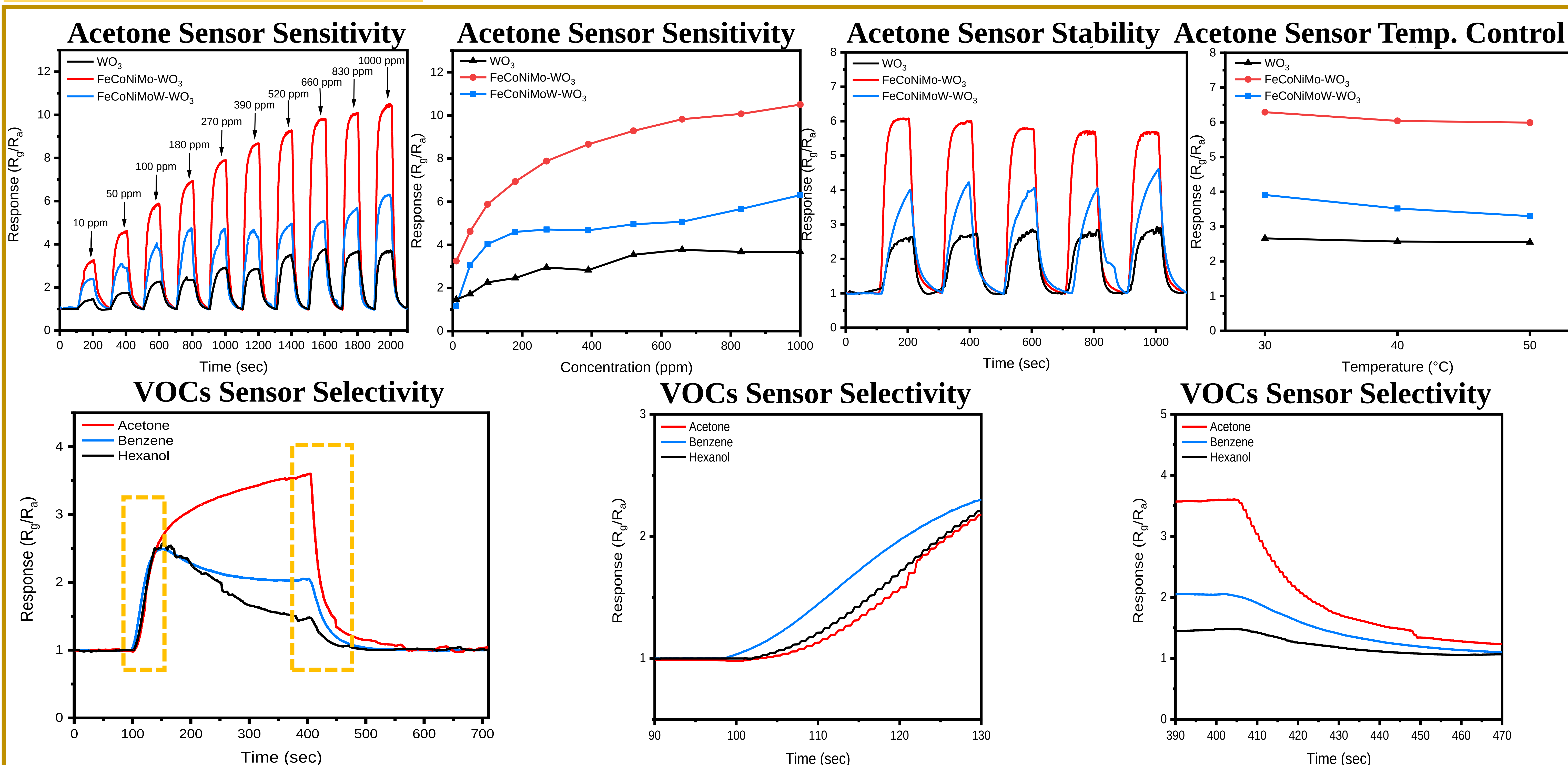
Experimental Methods



Characteristic of Products



Results and Discussion



Conclusion

The equipment and materials required for this study are inexpensive, and the preparation process is simple, requiring no expensive and complex analytical instruments, thus demonstrating good economic benefits and practical application potential. Furthermore, the sensing material exhibits good stability and reusability, and can be driven by sunlight for gas sensing, reducing energy consumption and aligning with green energy development principles. Future improvements in low-concentration gas detection capabilities and long-term stability could potentially lead to a low-cost, low-energy, and non-invasive disease screening technology.