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“Template Free Synthesis of Vanadium Oxide Nanostructures for Chemiresistive Sensing Application”

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Over past few decades, due to the rapid industrialization world-wide, the research and development on gas sensing devices are emerging at a large scale for maintaining a safe and secured environment. Gas sensors are mainly used to detect the presence and leakage of toxic and harmful gases released from various industries, coal mines, sewage treatment plants, gas pipelines and so on to avoid any combustibility that may harm human and the environment. Among several materials that is found in nature, nanostructured metal-oxide semiconductors are found to be the better gas sensing element due to its advantages such as sensitivity, stability, and low cost. Vanadium oxide (VOx) based semiconductors are emerging these days due to its catalytic activity that enhances the sensitivity of the material. The most interesting characteristic of gas sensing material is its nanostructured architecture which exhibits superior response than bulk due to its increased surface to volume ratio. In present work, we aimed to develop a 2-dimensional VOx nanostructures using dc magnetron sputtering technique. The deposited VOx nanostructured thin films were characterized for its structural, morphological and compositional analysis. The deposited VOx nanostructures were used as a sensing element to detect ammonia (NH₃) vapours at room temperature and methane (CH₄) gas at relatively low operating temperature.



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