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L-glycine-assisted synthesis of SnO2/Pd nanoparticles and their detection of biodeteriorating fungi

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Abstract

The presence of certain volatile organic compounds, such as 1-octen-3-ol, can be used as an indicator to detect the presence of destructive fungi in indoor buildings. In this study, the green synthesis of SnO2/Pd nanoparticles (NPs) via the L-glycine-assisted hydrothermal process, as a gas sensor was investigated. The amino acid acts as a reducing agent during the reduction of Pd(II) to Pd(0). The XRD and EDX results confirmed the presence of palladium on the surface of SnO2 NPs. The sensing properties of SnO2/Pd and pure SnO2 NPs for the detection of 1-octen-3-ol gas were analyzed by a static process. The SnO2/Pd and SnO2 NPs fabricated sensors showed a response of 15.7% and 10.6% at 50 ppm, and 46.7 % and 24.2% at 700 ppm of target gas at 250 °C, respectively. The SnO2/Pd NPs sensor showed higher sensitivity and selectivity than the pure SnO2 NPs, for the detection of 1-octen-3-ol. These experimental results demonstrate that the green synthesis of SnO2/Pd NPs have a good potential towards the detection of fungal biodeterioration in old and infected materials at an early stage of development or can uncover the hidden contaminants.

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