

Field-effect transistor gas sensor based on two-dimensional materials

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Abstract

Sensitive gas sensors are a key requirement for a large number of applications. Two-dimensional (2D) materials can be a preferred alternative as a low power consumption sensing device due to their ultra-high surface-to-volume ratios. In this work, we used few nm thickness 2D materials such as black phosphorus (BP) for developing a field-effect transistor gas sensor. Black phosphorus has been known as a more favourable material in many applications compared to other 2D materials due to its exceptional properties [1]. We demonstrated CO₂-sensing performance at room temperature. A clear shift in maximum conductance and current value were observed during CO₂ exposure. Our results show that the proposed method is a promising strategy to improve 2D materials gas sensors and has a potential for applications in advanced gas-sensing devices.

References

- [1] Arora, H., Fekri, Z., Vekariya, Y.N., Chava, P., Watanabe, K., Taniguchi, T., Helm, M. and Erbe, A., *Advanced Materials Technologies*, 2023, 8(2), p.2200546.