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CeNS designs pocket-sized sensor to detect health threats in air

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New low-cost sensor can help detect toxic sulfur dioxide (SO₂) gas



Scientists from Centre for Nano and Soft Matter Sciences (CeNS), Bengaluru, an autonomous institute of Department of Science and Technology (DST), have fabricated a sensor by combining two metal oxides- nickel oxide (NiO) and neodymium nickelate (NdNiO_3), through a simple synthesis process.

While NiO acts as the receptor for the gas, NdNiO_3 serves as the transducer that efficiently transmits the signal, enabling detection at concentrations as low as 320 ppb, far surpassing the sensitivity of many commercial sensors.

The new low-cost sensor can help detect toxic sulfur dioxide (SO_2) gas responsible for respiratory irritation, asthma attacks, and long-term lung damage, at extremely low concentrations.

SO_2 is a toxic air pollutant commonly released from vehicles and industrial emissions, and even minute exposure can cause serious health issues and long-term lung damage. It is hard to detect before it has an adverse effect on health. Monitoring SO_2 levels in real-time is crucial for public safety and environmental protection, yet existing technologies are often expensive, energy-intensive, or unable to detect the gas at trace levels.

With its high sensitivity, portability, and user-friendly operation, this sensor system offers a practical solution to monitor and manage SO_2 pollution, supporting public health and environmental safety. This work demonstrates the potential of material science to create accessible technologies for real-world challenges.