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QUANTUM DOT-PVA NANOFIBER COMPOSITE AS HIGHLY SENSITIVE QUENCHING FLUORESCENCE-BASED SENSORS

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During the last decade, gas sensing at ambient condition is of immense attention among the researchers in many realm of technologies. In this regard, the detection of volatile organic compounds VOC's, at room temperature, is exceedingly significant to the harmful category of solvent such as aromatic compounds chiefly benzene, toluene, ethyl benzene, xylene (BTEX) which are known as extremely harmful for the health of human beings. It is mostly accepted that the nanofibrous membranes enjoy specific surface area at least 1-2 order of magnitude larger than conventional flat films. In this work, fluorescent CaSe quantum dots were uniformly embedded in poly vinyl alcohol (PVA) nanofibers by electrospining of quantum dot - PVA mixed solution. The fabricated nanofibrous membrane was served as quenching fluorescence - based sensor to detect the trace of toluene vapor at room temperature. The experimental results demonstrated that the quantum dot - PVA nanofiber composite poses not only high sensitivity but also fast time - response upon the exposure of toluene vapor. Furthermore, the utilization of nanofibres with lower diameters in the membrane could enhance the result of sensing experiments.