

**PREPARATION OF COMMERCIAL POLYANILINE
COMPOSITES FOR AMMONIA DETECTION**

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ABSTRACT

PREPARATION OF COMMERCIAL POLYANILINE COMPOSITES FOR AMMONIA DETECTION

Polyaniline (PANI) is one of the versatile conducting polymers due to inexpensive monomer, environmental benign, high conductivity and easy preparation. In this study, PANI composites were synthesized via in-situ polymerization. PANI was doped by Dodecylbenzene sulfonic acid (DBSA) and mixed with composite shells (Egg shells, Crab shells and Mussel shells) to enhance the conductivity and stability of PANI in gas sensor detection. The characterizations were done by Fourier transform infrared (FTIR) and ultraviolet-visible (UV-Vis). FTIR spectra depict the main characteristic peaks of commercial PANI at $\sim 1599\text{ cm}^{-1}$ and $\sim 1462\text{ cm}^{-1}$ which indicates quinoid and benzoid units, respectively. UV-Vis spectra further confirmed the commercial PANI is in the doped state by exhibiting a characteristic peak at $\sim 800\text{ nm}$. Sensor measurement and performance of commercial PANI and PANI composite films were studied in terms of conductivity, selectivity, reusability and long-term stability. For sensor measurement, commercial PANI and PANI/CS shows comparable results which their LOD values are 14.45 and 15.42 respectively. PANI/CS film also exhibited best selectivity for NH_3 in the presence of common interfering species such as hexane, ethanol and acetone gas due to its ion-dipole interaction. For reusability, commercial PANI, PANI/CS and PANI/ES can be reused for 5,4,3 respectively. Finally, for the long-term stability, PANI/CS has shown the highest sensitivity after 7 days compared to commercial PANI and PANI/ES. In conclusion, PANI/CS shows the best application for NH_3 detection.