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Polymeric Sensing Materials for Detection of Agricultural Lagoon Gases

Every year, a large amount of agricultural waste is processed into manure and produces a high volume of biogas. A reliable gas sensor for composition and concentration analysis would aid in the quality control of manure and manage greenhouse gas emissions. For this purpose, a gas sensor that detects low concentration (5-50 ppm) of CH_3 and NH_3 is developed using gas-absorbing polymers. Polymeric materials can be modified with different dopants to produce different surface structures and chemical properties. With polyaniline doped with zinc oxide and tin oxide, there was an observable change in surface morphology which improved the sorption of formaldehyde at 10 ppm (used for lab experiments). Also, the addition of surfactant, SDS, and protic acid, HCl, helped increase the surface area of PANI and its gas sorption capability. This sensor is reversible and operable at ambient temperature, and hopefully optimal for the continuous detection of biogas in an agricultural setting.

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