Advanced NO_2 sensor Performance via Newly Synthesized MOF-derived Carbon Nanofibers

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Metal organic frameworks (MOFs), constructed via self-assembly by inorganic SBUs and organic ligand units, have emerged as an innovative porous material. Their enormous surface area, ordered structure, adjustable pore size and properties make it suitable for a variety of applications such as gas storage, separation and sensing. In particular, MOFs-derived carbon materials are useful for catalyzing electric reactions by reducing the insulating properties of MOFs.

On the other hand, the organic transistor-based gas sensor has the advantage of being light, flexible, and capable of detecting harmful gases by simply controlling the current, but has the disadvantage that the sensor characteristic is low due to a low degree of crystallinity and poor electrical conductivity.

In this study, we synthesized Z67@CNF with a new method using cobalt-porphyrin. In addition, poly(3-hexylthiophene), which is a conjugated polymer, and Z67@CNF were mixed for an active layer to analyze harmful gas adsorption and charge transfer characteristics of transistors. We can found that Z67(ZIF67) synthesized on CNF exhibited high reactivity to NO_2 due to improved dispersion and electrical conductivity by CNF.