

ENHANCED INDOOR AIR QUALITY BY SIMULTANEOUS REMOVAL OF AND VOCS AND FINE PM

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It has been widely reported that high concentration volatile organic compounds (VOCs) were observed in the indoor environment of new homes and commercial buildings, which were released mainly from new furnishings, glues, paints, etc. The VOCs have shown a strong correlation with lung cancer, hence, how to degrade VOCs effectively has drawn more and more attentions. The detection as important as removal of volatile organic compounds (VOCs) to reduce the risk of indoor air quality concerns. This study reports the rational synthesis of a dual-functional Janus nanostructure and its feasibility for simultaneous detection and removal of VOCs. The Janus nanostructure was synthesized via an anisotropic growth method, composed of plasmonic nanoparticles, semiconductors, and metal organic frameworks (MOF, e.g., Au@ZnO@ZIF-8). It exhibits excellent selective detection to formaldehyde (HCHO, as a representative VOC) at room temperature over a wide range of concentrations (from 0.25 to 100 ppm), even in the presence of water and toluene molecules as interferences. In addition to VOCs removal, developing low pressure drop but remaining high efficiency and high holding capacity filter used in front of MOF is necessary and important. We have discovered a composite media to fulfill this scope. The final goal is to combine these two modules into indoor air cleaner and HVAC system to minimize the potential adverse health effect by the indoor air pollutions. More details for the functions and coordination of these two modules will be discussed.