

Electronic Supplementary Information

Sensor Material Based on Occluded Trisulfur Anionic Radicals for convenient Detection of Trace Amounts of Water Molecules

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Synthesis of SAPO-CHA

The precursor material SAPO-CHA was synthesized from a hydrothermal reaction system in which fumed silica, aluminum hydroxide hydrate (62 wt% Al₂O₃), phosphoric acid (85 %), cyclohexylamine (C₆H₁₁NH₂) and hydrofluoric acid (40 %) were used as the reactants. A gel mixture with an empirical composition of 0.60SiO₂ : Al₂O₃ : 0.80P₂O₅ : 1.70C₆H₁₁NH₂ : 1.0HF : 80H₂O was sealed in a Teflon-lined stainless steel autoclave and heated at 180 °C for 8 days. The solid product was filtered, washed, and dried at ambient temperature. Then the template was removed by calcining the as-synthesized materials at 560 °C in air for 24 hours.

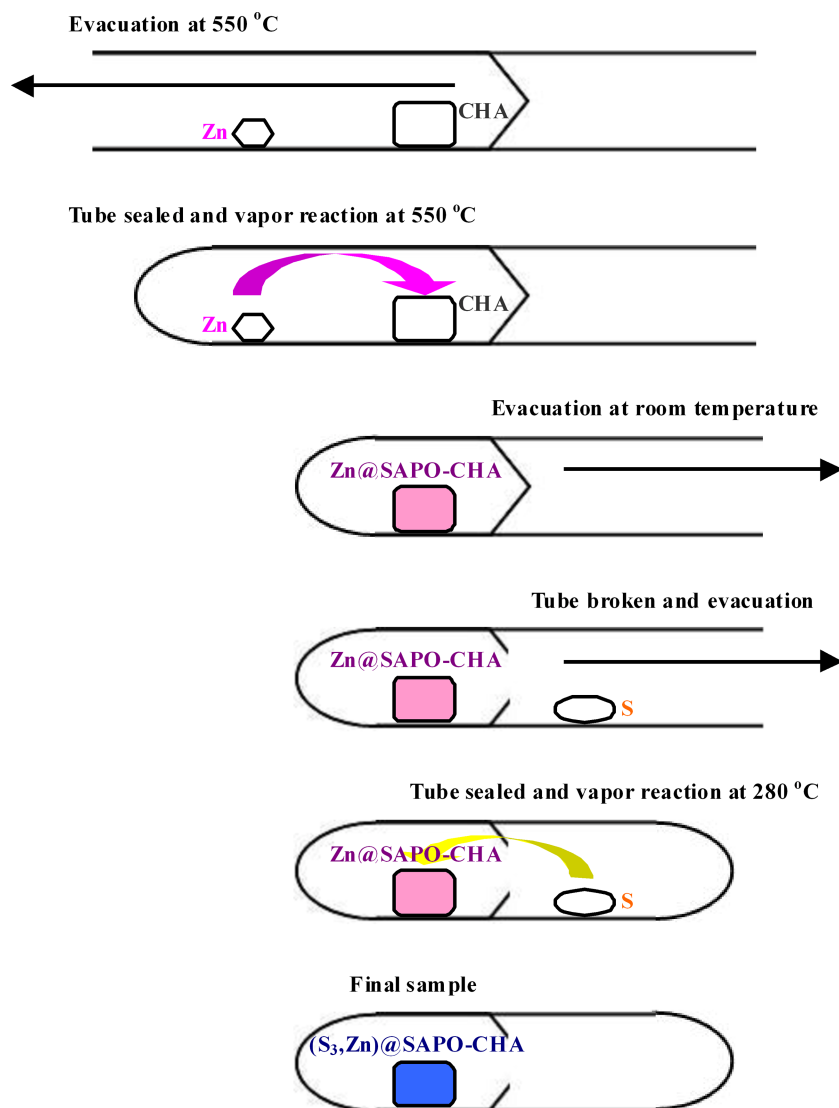


Fig. S1 Schematic representation for the preparation procedure of $(S_3,Zn)@SAPO-CHA$.

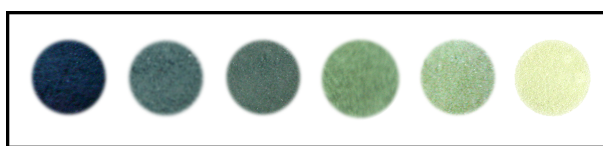


Fig. S2 Photographs of the $(S_3,Zn)@SAPO-CHA$ composite material after exposure to H_2O vapour (ca. 54 ppm) at different time intervals (0, 2, 4, 6, 10 and 15 minutes).

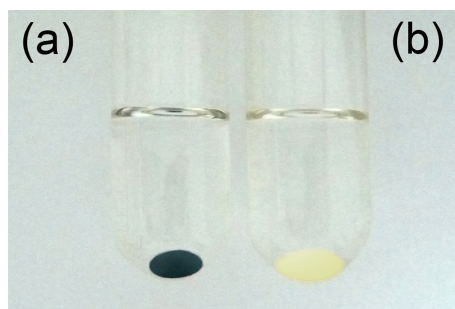


Fig. S3 The photograph demonstrating the colors of $(S_3,Zn)@SAPO-CHA$ in pure THF (a) and in a THF solution containing 500 ppm of H_2O (b).

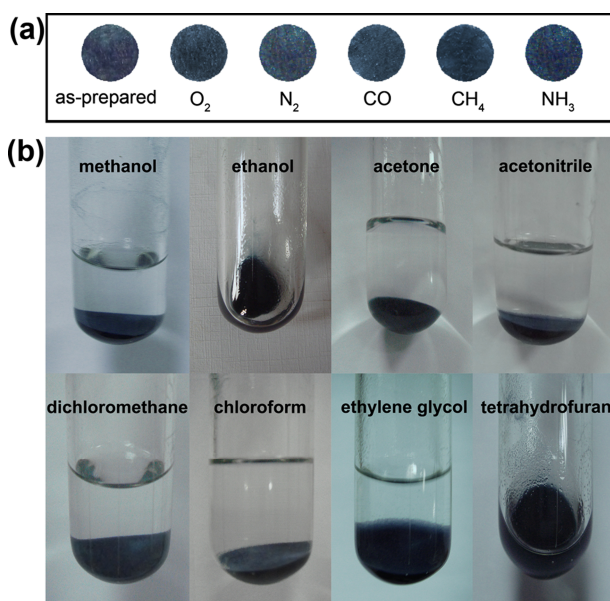


Fig. S4 (a) Photographs of as-prepared $(S_3,Zn)@SAPO-CHA$ and the samples after exposure to different gases (O_2 , N_2 , CO , CH_4 and NH_3) for more than 30 minutes and (b) photographs of the $(S_3,Zn)@SAPO-CHA$ in different organic solvents (methanol, ethanol, acetone, acetonitrile, dichloromethane, chloroform, ethylene glycol, and tetrahydrofuran).