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Ammonia assisted functionalization of cuprous oxide within confined spaces of SBA-15 for adsorptive desulfurization

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ABSTRACT

Purification of fuels via π-complexation adsorbents is amazing throughout the world in petroleum refineries. Cu(I)-based adsorbents are effective in all due to its low cost and high efficiency. However, the activity of such materials is still dependent on dispersion degree of Cu species. Herein, Cu^{+}-contented SBA-15 mesoporous adsorbents (Cu(I)/SBA-15) were synthesized using as-synthesized SBA-15 with ammonia driving incipient wetness impregnation (IWI) single step reduction strategy. In such strategy, $Cu(NO_3)_2$ precursor in the presence of ammonia was directly inserted into the microenvironment of SBA-15. The subsequent single step reduction strategy not only decompose Cu precursor to CuO and remove template P123 but also convert large number of CuO species into Cu(I), highly needed for π-complexation in adsorptive desulfurization. Our strategy is efficient for Cu dispersion than reported traditional approaches. The physicochemical characteristics of materials have been extensively studies by means of BET, XRD, SEM, TEM, TPR, XPS, TG-DTG and FT-IR techniques, and the proposed strategy promoted the Cu dispersion with high

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