High Temperature Adsorptive Desulfurization of diesel over metal silica nanocomposites materials

Palraj Kasinathan, 최재형, 이성찬, Huiqing Jin, 우희철†
부경대학교
(woohc@pknu.ac.kr†)

Deep desulfurization of diesel has become an important research subject due to the increasingly stringent requirements to reduce sulfur content in the application of molten carbonate fuel cell (MCFC). Different transition metal (Fe, Ni, Cu, Zn, Co) supported on silica were utilized to study as adsorbents for the desulfurization of diesel in a fixed bed reactor system. Copper silica nanocomposite, synthesized by loading copper on silica nanospheres, was utilized for adsorptive desulfurization (ADS) of commercial ultra low sulfur diesel (ULSD) at high temperature. By the precipitation–deposition method copper loading could be increased up to 50 wt% on silica while maintaining a Cu particle size smaller than 15nm, where the highest specific Cu surface area was obtained. The nickel and copper based adsorbent showed higher adsorption capacity compared to other metal oxides at 200oC. While 25% and 10% loading of copper on the silica has profound effect on adsorption. These adsorbents were characterized for the size of the metal nanoparticles and the surface morphology.