

Adsorptive removal of tetrahydrothiophene (THT) and tert-butylmercaptan (TBM) using Cu impregnated activated carbon at low concentration

고광준, 김효경, 김경민¹, 이창하[†]
연세대학교; ¹강릉원주대학교
(leech@yonsei.a.kr[†])

Sulfur compounds found in natural gas and fuel gas are hazard factors for health and equipment. In addition, sulfur compounds degrade performance of shift catalysts for hydrocarbon reforming and fuel cell electrodes by poisoning. Therefore, efficient removal of sulfur compounds is important to increase the process efficiency and the operation life time. Furthermore, international regulations are ever tightening to contain low-concentration sulfur compounds in natural gas products.

Tetrahydrothiophene (THT) and tert-butylmercaptan (TBM) are representative odorants in natural gas. Natural gas is widely used for H₂ production and sulfur odorants are contained to natural gas in ppm level for warning. Therefore, Research about adsorption behavior of sulfur compounds at low concentrations are needed.

In this study, the breakthrough experiments for THT and TBM adsorption balanced with CH₄ were conducted with modified activated carbon at low concentration (~5ppm) at two different temperature (30°C and 60°C). Then, the adsorption capacity and breakthrough characteristics were evaluated. And, the adsorption characteristics of THT and TBM according to temperature were interpreted by XPS.