Shaobo Wang, J Pollut Eff Cont 2018, Volume: 06
10.4172/2375-4397-C1-011

5th Global Summit and Expo on Pollution Control
October 25-27, 2018 | Prague, Czech Republic

Adsorptive removal of hydrogen sulfide by amine-functionalized mesocellular siliceous foams

Shaobo Wang

University of Nottingham, UK

The removal of hydrogen sulfide (H_2S) present in either industrial flue gas or product gas has long been either an economic or an operational challenge in the clean utilization of fossil energy as well as in waste disposal. Adsorptive capture and conversion represent a new concept which aims to remove the acid gas in a more economically favorable way than the conventional wet-absorption-based methods. This study focused the attention on H_2S capture by an emerging porous solid sorbent, mesocellular siliceous foams (MCF) which has a high degree of porosity and a large surface area and is suitable and effective for gas-phase pollutant separation. Polyethyleneimine (PEI) and Tetraethylenepentamine (TEPA) loaded MCFs were synthesized and tested on H_2S adsorption/desorption via thermogravimetric analysis (TGA) and fixed bed reactor for the determination of their adsorption characteristics. The surface textural properties and morphology of the samples were depicted by nitrogen adsorption, BET measurement, Fourier-transform infrared spectroscopy (FTIR) and different electron microscopes (SEM and TEM). Amines were immobilized onto PQ-silica and lab-prepared MCFs via impregnation and grafting, respectively. The adsorption/desorption test of amine-supported composite silica over H_2S are conducted on TGA first. Despite the high H_2S adsorption capabilities, the hybrid aminosilica still offer a thorough regeneration under low amplitude temperature swing (range from 25-100°C). The quantity of available amine groups on the adsorbent surface and the interaction between H_2S molecules and amine groups are believed to be the two key factors that influence the adsorption capacity and amine efficiency.

Biography

Shaobo Wang is currently working on his PhD in the research group of Clean Fossil Energy and Carbon Capture Technologies, University of Nottingham, UK. His current focuses are on the capture and conversion fossil fuel related multiple-pollutant.

wangshaobo.app@gmail.com

Notes: