A Gęsikiewicz-Puchalska et al., J Earth Sci Clim Change 2016, 7:9(Suppl)
http://dx.doi.org/10.4172/2157-7617.C1.028

CO_2 adsorption over ammonia treated zeolite 13X

A Gęsikiewicz-Puchalska, M Zgrzebnicki, R J Wrobel, U Narkiewicz, B Michalkiewicz and A W Morawski
West Pomeranian University of Technology, Poland

The emission of carbon dioxide into the atmosphere from the fossil fuels is considered as major sources of the greenhouse effect. Capture with solid sorbents followed by underground storage is one of the most appealing options to reduce of CO_2 emission. Zeolites are microporous, crystalline materials with well-defined structures. Due to highly porous and consistent matrix, aluminosilicate are a potential material for CO_2 capture. In this study commercial zeolite 13X was treated with gaseous ammonia at different temperatures from 200 to 700°C. 1 g of zeolite was placed in a ceramic boat and put into tube furnace. The sample was heated in argon flow. When the furnace reached the desired temperature, the atmosphere was changed from argon to ammonia and then held for 2h. After this time the sample was cooled down to 100 °C. Finally the flow was switched to argon. Under this atmosphere the furnace reached room temperature. The samples were characterized by powder X-ray diffraction, X-ray photoelectron spectroscopy and nitrogen adsorption-desorption isotherm measurements at 77 K. CO_2 uptake was evaluated by isotherm measurement carried out at 298 K and pressure up to 0.95 atm. The modified with ammonia samples indicated improvement of CO_2 adsorption capacity. The CO_2 uptake was the largest for ammonia treated sample at 600 °C.

Biography

A Gęsikiewicz-Puchalska graduated from the Faculty of Chemical Technology, Adam Mickiewicz University in Poznan in 2013. Currently, she is a PhD student at the Institute of Chemical and Environmental Engineering, West Pomeranian University of Technology in Szczecin. Her specialty is in inorganic chemical technology. She works in the Polish-Norwegian research project.

endzig89@wp.pl

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