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CARBON DIOXIDE SORPTION PROPERTIES OF FLY ASH ZEOLITES DIFFERENTIATED IN CASE OF SYNTHESIS PROCESS

N Czuma, K Szczurowski, K Zarębska and P Baran

AGH University of Science and Technology, Poland

Zeolite synthesis out of fly ash is a worth noticing, low budget alternative for the production of zeolites compared to natural zeolites or zeolites produced from pure chemicals. Generally, zeolites due to their structure represent interesting properties (ion-exchange, catalytic, sorptive). Based on the sorption properties it is possible to use this material as a sorbent for flue gases impurities such as carbon dioxide. Energy sector in Poland is mainly based on burning of brown and hard coal. Environmental concerns and legal aims oblige to reduce the emission of greenhouse gases emitted to the atmosphere. Due to restrictions on the emission limits, it is crucial to search for differentiated methods for CO_2 capturing adapted for the economy new needs. The use of zeolites such as sorbent in the industrial processes may have a positive ecological result, not only due to the elimination of disadvantages of commonly used CO_2 capture absorption methods, but also due to the usage of waste material as a raw material for the synthesis. Fly ash zeolites may be synthesised by different methods which affect the final product. It influences the type and amount of zeolite present in the synthesized sample and in this way the sorption properties of synthesized materials. In this work, the comparison of CO_2 sorption of 3 fly ash zeolites samples synthesized by differentiated methods were presented. Synthesis methods chosen were: hydrothermal method, fusion method and modified two-step method. Results indicated different sorption capacity due to zeolite type present, synthesis efficiency and for similarities in isotherm shapes connected with the presence of micropores.

Biography

N Czuma is a PhD student at AGH University of Science and Technology in Kraków, Poland. Her PhD work focuses on fly ash synthesis and its sorption properties in relation to CO2 and SO2. Additionally, her scientific interest focuses on other fly ash uses such as carbonation processes and geopolymer synthesis. She is a member of InnoEnergy PhD School. She had participated in national and international internships including cooperation with EDF Poland S A, Lublin University of Technology, UPC-Universitat Polytecnica de Catalunya and Université Pierre et Marie CURIE.

nczuma@agh.edu.pl