

Documents

Nizami, A.S., Ouda, O.K.M., Rehan, M., El-Maghraby, A.M.O., Gardy, J., Hassanpour, A., Kumar, S., Ismail, I.M.I.

The potential of Saudi Arabian natural zeolites in energy recovery technologies

(2016) *Energy*, 108, pp. 162-171. Cited 44 times.

Abstract

Energy consumption in KSA (kingdom of Saudi Arabia) is growing rapidly due to economic development with raised levels of population, urbanization and living standards. Fossil fuels are currently solely used to meet the energy requirements. The KSA government have planned to double its energy generating capacity (upto 120 GW (gigawatts)) by 2032. About half of the electricity capacity of this targeted energy will come from renewable resources such as nuclear, wind, solar, WTE (waste-to-energy) etc. Natural zeolites are found abundantly in KSA at Jabal Shamah occurrence near Jeddah city, whose characteristics have never been investigated in energy related applications. This research aims to study the physical and chemical characteristics of natural zeolite in KSA and to review its potential utilization in selected WTE technologies and solar energy. The standard zeolite group of alumina–silicate minerals were found with the presence of other elements such as Na, Mg and K etc. A highly crystalline structure and thermal stability of natural zeolites together with unique ion exchange, adsorption properties, high surface area and porosity make them suitable in energy applications such as WTE and solar energy as an additive or catalyst. A simple solid–gas absorption system for storing solar energy in natural zeolites will be a cheap alternative method for KSA. In AD (anaerobic digestion), the dual characteristics of natural zeolite like Mordenite will increase the CH₄ production of OFMSW (organic fraction of municipal solid waste). Further investigations are recommended to study the technical, economical, and environmental feasibility of natural zeolite utilization in WTE technologies in KSA. © 2015 Elsevier Ltd

2-s2.0-84938151306

Document Type: Article

Publication Stage: Final

Source: Scopus