Modification of Synthetic Zeolite Pellets from Lignite Fly Ash A : The Pelletization

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ABSTRACT

The possibility of the use of synthetic zeolites from coal fly ash as adsorbent in water purification has also been investigated in a number of studies but the development of its another form with more appropriate for real industrial application has not been clarified adequately. This study focuses on modification zeolite synthesized from coal fly ash in pellet form by simple ceramic technology. The XRD results showed that our zeolite, which was hydrothermally synthesized (1 M of NaOH solution at $110\,^{0}C$ 1 atm 96 hr) from Mae Moh Coal Fired Power Plant in Thailand, were Na-P1 type (JCPDS 39-0219) which is the typical product by zeolitization of coal fly ash and preferable to achieve a high CEC values (2.49 meq/g). These pellets were prepared by wet granulation of zeolite Na-P1 with bentonite used as a binder and Poly(Vinyl) Alcohol (PVA) ,which play in 'pore forming agent' role, was added during the pelletization. For temperatures effect study, the heating temperatures was optimized through some physical properties after PVA burnout. When the temperature was increased, a mechanical strength was gradually increased untill $800\,^{0}C$ and had been rapidly increased after $800\,^{0}C$. While its apparent density had been rapidly decreasing at $800\,^{0}C$ and then increased after that. For modifying pellet study, the specific surface area was increased with increasing PVA content after burnout at selected temp as $800\,^{0}C$ (maximum 28.68 sq.m/g at 15% PVA content), due to leaving large pores behind. Moreover, the cation exchange capacity was increasing in the same tendency (maximum 0.55 meq/g at 15% PVA content). This may be implied that these artificial pore probably can be incresing ion accessibility. However this application still want to further study.

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