La-Orngdow Mulsow 2012: A Study of Calcium Zeolite Type A from Eggshells Forming Using Binder, Compression and Polyurethane Foam as Template. Master of Engineering (Materials Engineering), Major Field: Materials Engineering, Department of Materials Engineering. Thesis Advisor: Miss Nuchnapa Tangboriboon, Ph.D. 112 pages.

The purpose of this research is to try to fabricate calcium zeolite type A from eggshells as a starting material via the sol-gel process. Forming using binder method, compression, and polyurethane foam as a template. The received samples were characterized phase formation by x-ray diffraction (XRD), microstructure by Scanning Electron Microscopy (SEM), pore size and specific surface area by Brunaues-Emmet-Teller (BET), mechanical properties of foam composite (gel_110+PU foam or gel_300+PU foam) by compression test, the functional groups by the Fourier Transformation Infrared Spectroscopy (FT-IR). Thermal properties of the endothermic-exothermic reaction by DTA and the percentage of weight loss were measured by TGA. In addition, micrographs of dispersion were characterized by Transmission Electron Microscope (TEM). The results demonstrated that $CaNaAlSi_2O_7$ can be fabricated to granules by using CMC as binder. The first method is granule preparation; granule product was prepared by coating on filter paper with granules dispersed on the filter paper by adhesive glue. The second method of samples prepared by compression was studied the specificion surface area that showed high surface area. The last method of sample preparat aims to produce polymer matrix composite (PMCs) between $CaNaAlSi_2O_7$ and PU foam as a matrix. The suitable composition of composite materials is 10% vol $CaNaAlSi_2O_7$ added into PU foam. The average particle size of $CaNaAlSi_2O_7$ is approximately 10μm, non-agglomeration, and good dispersion in the entire volume of PU foam. The composite foam cells are well ordered and uniform in size and shape. The true density, elastic modulus,and compressive strength of $CaNaAlSi_2O_7$ / PU composites are 1047g/cm^3, 0.0327 Kgf/mm^2, and 0.0188 Kgf/mm^2, respectively. The phase formation of $CaNaAlSi_2O_7$ / PU composites is shown both crystalline phase of tetragonal phase formations of $CaNaAlSi_2O_7$ and amorphous phase formation belonging to polyurethane (PU).

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