THE UV-VIS ABSORPTION STUDY OF ZEOLITE NANOPOWDER COATED WITH POTASSIUM AND PHOSPHORUS

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ABSTRACT

THE UV-VIS ABSORPTION STUDY OF ZEOLITE NANOPOWDER COATED WITH POTASSIUM AND PHOSPHOROUS

Zeolites are aluminosilicate solids bearing a negatively charged honeycomb framework of micropores into which molecules may be adsorbed for environmental decontamination, and to catalyse chemical reactions. They are central to green-chemistry since the necessity for organic solvents is minimised. Proton-exchanged (H) zeolites are extensively employed in the petrochemical industry for cracking crude oil fractions into fuels and chemical feedstocks for other industrial processes. Due to their ability to perform cation-exchange, in which the cations that are originally present to counterbalance the framework negative charge may be exchanged out of the zeolite by cations present in aqueous solution, zeolites are useful as industrial water-softeners, in the removal of radioactive Cs^{+} and Sr^{2+} cations from liquid nuclear waste and in the removal of toxic heavy metal cations from groundwaters and run-off waters. Surfactant-modified zeolites (SMZ) find particular application in the co-removal of both toxic anions and organic pollutants. In this study, under the procedure of Wet Milling Method, Zeolite nanoparticles was produce. Zeolite coated with solution of KH_2PO_4 and KCl with different molarity 0.1mol, 0.5mol and 1.0mol. Characterization of Zeolite was performed by using Particle Sizer, X-ray Diffraction (XRD), and Field Emission Scanning Electron Microscopy (FESEM). The leach of two main element which is Potassium and Phosphorus from Zeolite as it had been coated were observed by UV-Vis Spectroscopy. From result, it was observed that, from the first wash, the main element Potassium and Phosphorus, was drastically leach. Followed by further wash, the release rate were quite constant. Zeolite nanoparticles were washed for at least four times in order to observed the efficiency of Zeolite control release rate of the two element, Potassium and Phosphorus.

CHAPTER 1

INTRODUCTION

1.1 Background

Zeolite

Zeolites are crystalline aluminosilicates, composed of TO_4 tetrahedra (T = Si, Al) with O atoms connecting neighbouring tetrahedral, that contain pores and cavities of molecular dimensions (Breck, 1974). Many occur as natural minerals, but it is the synthetic varieties which are among the most widely used sorbents, catalysts and ion-exchange materials in the world (Barrer, 1982).

The channels are large enough to allow the passage of guest species. In the hydrated phases, dehydration occurs at temperatures mostly below about 400°C and is largely reversible. The framework may be interrupted by (OH, F) groups that occupy a tetrahedron apex that is not shared with adjacent tetrahedral (CooMBS et al.1998). Zeolites are different from other porous hydrates, as they retain their structural integrity upon loss of water.