

Phattaranat Indarawirat 2009: Moisture Adsorption Characteristics of Commercial Zeolite A. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Phungphai Phanawadee, D.Sc. 64 pages.

Equilibrium moisture content and moisture adsorption rate of zeolite A were determined using the gravimetric method at different relative humidities and temperatures of 25, 35 and 45°C. For each test, a commercial zeolite A sample of 1 g corresponding to 2 mm. thickness of sample was placed in a chamber containing a specific saturated salt solution to generate the desired relative humidity. Correlation between the equilibrium moisture content and the relative humidity over a range of 5.5-100% follows type II isotherm. It was found that the excess surface work (ESW) model describes the isotherm much better than the Langmuir and the Langmuir-Freundlich models. Over the range of relative humidity of 50-100%, plots of adsorption rate versus moisture content show typical characteristics, i.e., the rate is constant at low moisture content and starts to decrease at critical moisture content until the moisture content reaches the maximum. The critical moisture contents at different relative humidity and temperatures are reported. It was also found that the adsorption rates are well described by the Linear Driving Force (LDF) model. The moisture diffusivity in zeolite A calculated from the LDF model increases with increasing temperature and relative humidity.

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