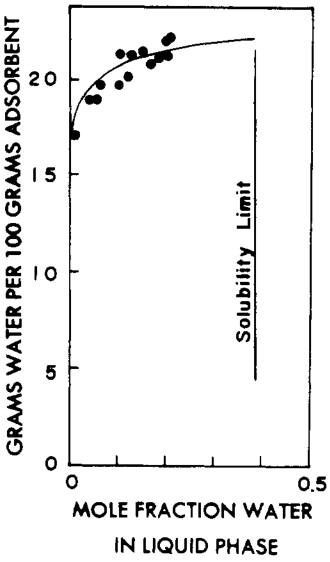

← Figure 2. Comparison of calculated isotherm with experimental data for benzyl alcohol–water–5A Molecular Sieves

— Calculated isotherm
● Experimental data

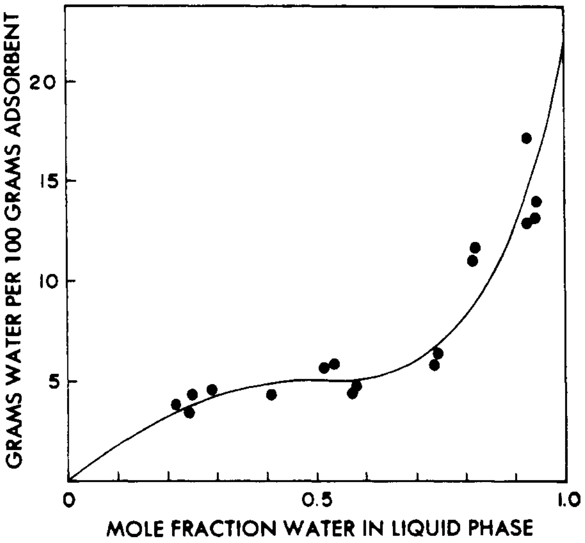

Figure 3. Liquid phase isotherm for ethylenediamine–water–4A Molecular Sieves

pressure of water over the two-liquid phase, benzyl alcohol-water system was assumed to be equal to the vapor pressure because of the low solubility of benzyl alcohol in water reported by Seidell and Linke. The four data points listed in Table III lie on a smooth curve and are considered to be reliable.

RESULTS

The calculation procedure described previously was used to calculate liquid phase isotherms for comparison with experimental data. For these systems, the pressure is low enough so that fugacities may be replaced by partial pressures.

p-Dioxane–Water–5A Molecular Sieve at 25° C. Using the published vapor isotherm for water on 5A Molecular Sieves (*3*), and vapor-liquid equilibrium data for the *p*-dioxane-water system at 25° C. (*1*), the liquid phase isotherm was calculated and is plotted on Figure 1 along with the experimental data points. The calculated isotherm agrees quite well with the experimental data points.

Benzyl Alcohol–Water–5A Molecular Sieve at 25° C. The partial pressure data of Table III were used along with the vapor isotherm for water on 5A Molecular Sieve (*3*) to calculate the liquid phase isotherm for this system. The calculated isotherm and the experimental data points are plotted on Figure 2 which shows that the agreement is good.

Ethylenediamine–Water–4A Molecular Sieve at 25° C. The system ethylenediamine-water shows evidence of large negative deviations from ideal behavior as witnessed by maximum boiling azeotropes in the range 45° to 175° C. (*6*), an extremely large exothermic heat effect on mixing, and compound formation in the solid-liquid phase diagram (*7*). No vapor-liquid equilibrium data are available for this system at 25° C., and the partitioning technique employed for the benzyl alcohol–water system was not workable hence no liquid phase isotherm could be calculated. The experimental data are plotted in Figure 3. The distorted shape of the isotherm illustrates the importance of solution effects in determining liquid phase adsorption equilibria.

CONCLUSIONS

The proposed analysis of liquid phase adsorption equilibria in systems containing Molecular Sieve adsorbent, and one adsorbable component has been quantitatively tested for two systems and was found reliable. Although a quantitative test was not possible, the third system strikingly illustrates the effect of solution behavior on liquid phase adsorption equilibria.

NOMENCLATURE

A = weight of adsorbent, grams
a = adsorbent loading, grams per 100 grams adsorbent
L_0 = initial weight of liquid solution, grams
w = weight fraction of adsorbable component in liquid phase
w_0 = initial weight fraction of adsorbable component in liquid phase

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CORRECTION:

In the article "Refractive Index of Phosphoric Acid Solutions at 25° C.," [J. CHEM. ENG. DATA **9**, 508 (1964)] there are two errors. The second and third sentences of the paragraph following Equation 3, page 509, should read "This precision of Δn corresponds to an uncertainty in j_m of 0.22 fringe. Throughout the entire range of concentration, . . . " The second sentence of the paragraph following Equation 7, page 509, should read "This requirement is met for phosphoric acid, within the accuracy of Equation 3, for all except the most dilute solutions in Table I of reference (*4*)—that is, when the top solution of the diffusion cell is water."