

Determination of the selectivity coefficient of the CMX cationic membrane at various ionic strengths

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ABSTRACT

Equilibrium between CMX cationic membrane and solutions of cations at various ionic strengths were studied and the affinity order for different counter-ions was made. Membrane water content and ion exchange capacity were determined. The equilibrating solutions were equimolar mixtures of alkaline nitrates of potassium, sodium and calcium and the ionic strength (I) was varied from 0.1 to 1.5 mol.L⁻¹. All experiments were maintained at constant temperature (25°C). Adsorption isotherms for the five binary systems: Na⁺/K⁺, Li⁺/K⁺, Li⁺/Na⁺, Na⁺/Ca²⁺ and K⁺/Ca²⁺ were studied. The affinity order observed was: K⁺ > Ca²⁺ > Na⁺ > Li⁺. Selectivity coefficients $K_{Na^+}^{K^+}$, $K_{Li^+}^{K^+}$, $K_{Li^+}^{Na^+}$, $K_{2Na^+}^{Ca^{2+}}$ and $K_{2K^+}^{Ca^{2+}}$ were determined at 25°C. The selectivity coefficients decreases with increasing ionic strength for low values of I and tended asymptotically to the unity for high values of I .

Keywords: Ion exchange membrane; Selectivity coefficients; Isotherms; Binary system

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