
Ion-Exchange Properties of the Natural Zeolite Erionite¹

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³ Ed. note. See Deffeyes, K. S. (1959) Erionite from Cenozoic tuffaceous sediments, central Nevada: *Am. Mineral.* **44**, 501-509; Papke, K. G. (1972) Erionite and other associated zeolites in Nevada: *Nev. Bur. Mines Geol. Bull.* **79**, 32 pp.

Abstract: Natural erionite was exhaustively ion exchanged with Na⁺ to give the anhydrous unit-cell composition (K_{1.9}Na_{5.4}Ca_{0.1}Mg_{0.1})[(AlO₂)_{7.4}(SiO₂)_{28.6}]. A thermodynamic study of alkali and alkaline earth metal ion exchange in this zeolite was made and the selectivity series found to be Rb > Cs ≥ K > Ba > Sr > Ca > Na > Li. In all cases approximately two K⁺ ions per unit cell (probably those in the cancrinite cages) could not be replaced by conventional ion exchange. It was also found that two Na⁺ ions per unit cell are extremely difficult to replace with alkaline earth ions. It is believed that complete replacement of the approximately six Na⁺ cations in the two large cages per unit cell of erionite would result in a non-uniform, divalent cation population in these cages. A more stable anhydrous composition is (K₂Ca₂Na₂)[(AlO₂)₈(SiO₂)₂₈] in which each large cage contains one Ca_{2*} or other alkaline earth cation and one Na⁺ ion.

Key Words: Erionite • Ion exchange • Offretite • Selectivity • Zeolite • Zeolite T

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