# Adsorption of Cations on Imogolite and Their Effect on Surface Charge Characteristics[1]

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[1]Contribution from the College of Agriculture and Home Economics Research Center, Pullman, Washington. Paper No. 9101-07. Projects 0694 and 4694.

**Abstract:** Noncrystalline aluminosilicates termed allophane and imogolite are common constituents of spodosols, soils derived from volcanic ash, and many inceptisols. The surface charge characteristics of their synthetic analogues may be used to better understand their ion retention properties. In this study, we determined the point of zero salt effect (PZSE) by potentiometric titration of allophanes with Al/Si ratios of 1.12, 1.52, and 2.04 and of imogolite with an Al/Si ratio of 2.02. We also used microelectrophoresis to determine the point of zero charge (PZC) at the particle shear plane for the same materials in Cl solutions of Li, Na, Cs, and tetramethyl ammonium. The PZSE decreased with decreasing Al/Si ratio for the allophanes, but the imogolite PZSE was much lower than that of the allophane with 2.04 Al/Si. The PZC was always higher than the PZSE of the same material, especially for imogolite. The results are best explained if cations reside within the hollow tubes of imogolite. This conclusion is supported by a fluorescence study that showed that only quenchers smaller than the inner diameter of the imogolite tube could fully quench Ce-imogolite.

**Key Words:** Electrophoretic mobility • Microelectrophoresis • Noncrystalline aluminosilicates • Points of zero charge • Potentiometric titration • PZC • PZNPC • PZSE • Structural models • Surface charge • Surface complexation

*Clays and Clay Minerals*; December 1992 v. 40; no. 6; p. 700-706; DOI: 10.1346/CCMN.1992.0400609

Clay Minerals Society (www.clays.org)