
Low Frequency Dielectric Dispersion of Clay-Water-Electrolyte Systems

Kandiah Arulanandan and James K. Mitchell

Department of Civil Engineering, University of California, Davis, California
Department of Civil Engineering, University of California, Berkeley, California

Abstract: The dielectric properties of saturated kaolinite clay-water-electrolyte systems were determined over the frequency range of 30– 10^5 c/s. Very large dielectric constants are observed at low frequencies. Since the experimental data approach constant values at each end of this frequency spectrum, they can be described by a fairly well defined spectrum of relaxation times. The particle size and orientation, the type and amount of electrolyte, and temperature affect the low frequency dielectric increment and the average relaxation time. Several physical processes, such as relaxation due to dipolar rotational polarization, interfacial polarization, free space charge and bound ion polarization, are examined in an attempt to explain the observed data. It is concluded that there exists at present no theory to explain all the data, but the bound ion polarization mechanism appears to explain some of the results.

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