Geophysical Research Abstracts, Vol. 9, 07137, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07137

Dielectric spectrocopy of concentrated suspensions of Hematite particles in a broad frequency range

S. Ahualli (1), M. Tirado (2), C. Grosse (2,3), A.V. Delgado (1)

(1) Dept. of Applied Physics, University of Granada, Spain, (2) Dept. of Physics, University of Tucumán, Argentina, (3) Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina (mtirado@herrera.unt.edu.ar, / Fax: +34958243214 / Phone: +34958243209)

The dielectric properties of aqueous suspensions of Baiferrox 130 particles were measured over a broad frequency range extending from 1 kHz to 300 MHz. The low-frequency measurements (1 kHz to 10 MHz) were performed using a HP 4192 A Impedance Analyzer with a parallel electrode variable spacing cell. The high-frequency spectra (300 kHz to 300 MHz) were obtained using a HP 8753 A Network Analyzer with a reflection cut-off measuring cell.

These measurements were complemented with determinations of the low-frequency conductivity using a Orion 160 Conductivity Meter with a 4 electrode cell, of the pH using a PerpHecT model 370 meter, and of the dynamic mobility of the particles using an Acoustosizer II (Colloidal Dynamics, USA).

The suspensions were prepared using different volume concentrations of Baiferrox 130 (Fe_2O_3) spherical particles with 170 nm diameter and 5 g/ml density. They were suspended in in KCL solutions at 10^{-4} M. Suspensions with the same particle and KCl concentrations were also prepared using the Baiferrox 130 particles covered with ethyl-2-cyanoacrylate layer.

The dielectric and mobility spectra obtained were analyzed and interpreted using existing theoretical models for the counterion polarization and the Maxwell-Wagner-O'Konski dispersion processes, as well as a numerical model specifically developed for the soft particle suspensions.