Dielectric Relaxation Study of $Zn(NO_3)_2$, $Cu(NO_3)_2$, $Ni(NO_3)_2$, and $Mg(NO_3)_2$ Solutions in Water/DMSO Mixtures

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Dielectric spectra have been measured for the title systems up to 72 GHz at 20 °C with salt concentrations ≤1 mol/l and DMSO mole fractions of the mixed solvent in the 0.3 to 0.6 range. Results can be described by a superposition of two Debye terms (at lower frequencies) plus one Cole-Davidson term (at higher frequencies). The discussion is particularly focused on the lowest frequency term, which is related to ionic species. These are likely to consist in nonsymmetrically solvated cations rather than ion pair complexes. While Cu, Ni and Mg nitrates behave similarly, the Zn salt shows some differences which possibly are due to a change of the coordination number with increasing salt content.

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