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EFFECT OF HUMIDITY ON THE DIELECTRIC PROPERTIES OF MICA

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The dielectric properties of local muscovite mica samples of different solid inclusion contents, equilibrated with atmospheres of 15% to 95% relative humidity in the temperature range 293 K to 333 K were investigated. AC conductivity and permittivity in the frequency range 100 Hz to 20 k Hz, measured using a three terminal electrode system, are presented in this paper.

The conductivity values were in the range 1.5×10^{-10} (ohm m)$^{-1}$ to 4×10^{-7} (ohm m)$^{-1}$ while the permittivity values were between 16 and 4. An increase in conductivity and a decrease in permittivity were observed with increasing frequency. Generally both the conductivity and the permittivity increased with humidity. This effect was more pronounced at the higher humidities and temperatures, at lower frequencies and in samples with higher inclusion contents.

It is suggested that the observed behaviour is due to Maxwell-Wagner effects[2] created by the moisture that has diffused in-between the sheets of the laminated mica structure and that the adsorption of this moisture onto the surfaces of these sheets is governed by the dynamic throry by sorption[1].

References

1. Hasted, J. B. (1961). *Progress in Dielectrics,* London : Heywood & Co. Ltd., **3,** 103.
2. Von Hipple, A. (1954). Dielectric Materials and Applications. New York : John Wiley & Sons, Inc., 228.