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# Dielectric Properties of Linear Low Density Polyethylene /Ethylene Vinyl Acetate Co-Polymer Blends: Effects of Blend Ratio, Carbon Black Addition, and Dynamic Vulcanisation

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The dielectric properties of linear low-density polyethylene (LLDPE)/ethylene vinyl acetate (EVA) co-polymer blends have been investigated. The dielectric properties have been determined against varying frequencies with special reference to the effect of blend ratio, dynamic vulcanization, and carbon black (CB) addition. The dielectric properties measured were dielectric constant ($\varepsilon$' ),volume resistivity ($\rho_v$ ), loss factor ($\varepsilon$'' ),and dissipation factor (tan $\delta$ ).Generally the dielectric constant of the blends decreased with increasing frequency. Addition of EVA to LLDPE decreased the volume resistivity of LLDPE. But 50/50 blend shows the maximum volume resistivity. The loss factor and tan $\delta$ increase with increasing frequency and attains a maxima followed by a decrease. The variation of dielectric properties was correlated with morphology so as to establish the relationship between morphology and the properties. The variation of dielectric properties upon dynamic vulcanization of the blends with dicumyl peroxide (DCP) was also studied. The DCP vulcanization affects dielectric constant, volume resistivity and loss factor. The effect of addition of different carbon black (CB) at different loading was also a point of investigation. It was found that CB ($N_{110}$) has a percolation threshold at 10% loading in the50/50 blend. In general addition of CB decreased the dielectric constant. The experimental data are discussed in relation to the prediction of statistical mixture type equations.