Research highlights

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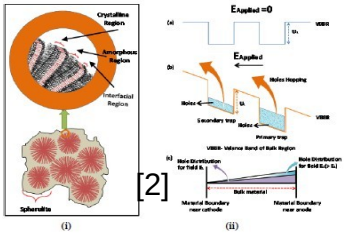
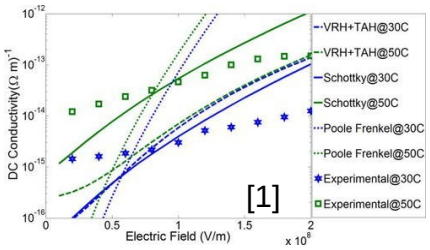
1.Fundamental research on charge transport in dielectrics: proposed a new mechanism of conduction, in contrast to conventional schottky, poole-frenkel mechanisms along with charge formation in dielectrics [1, 2]

2.Novel design of HVDC converter transformer proposed. The insulation between turn to turn and winding to core of star-connected top transformer on valve side is proved the most vulnerable and will decide the design levels [3].

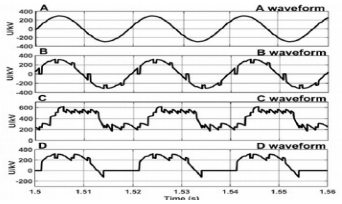
3.Novel method for surface voltage measurement of covered conductor has been proposed. Until now, there is no method for direct measurement of voltage on an insulating surface [4].

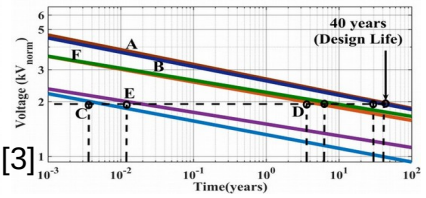


[2]

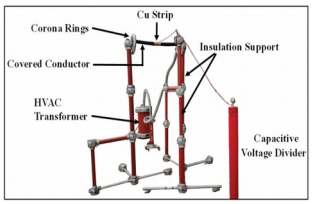


[1]



[3]




$$V_m = V_a \times \frac{1}{1 + \frac{C_{g2}}{C_{2sq}+C_{g1sq}} + \frac{C_{m1}\times C_{m2}}{(C_{2sq}+C_{g1sq})\times(C_{m1}+C_{m2})}}.$$

[4]

$$k_1 = \frac{C_c + C_{g1}}{C_{g2} + C_{m1}}\mathrm{m}^{-1} \quad \text{and} \quad k_2 = \frac{2\times(\Delta C_c + \Delta C_{g1})}{C_{g2} + C_{m1}}.$$


[1]. Avnish K. Upadhyay and C. C. Reddy, On the mechanism of charge transport in low density polyethylene, Journal of Applied Physics 122, 064105 (2017); https://doi.org/10.1063/1.4997941

[2]. A. K. Upadhyay and C. C. Reddy, "Analytical model for homocharge accumulation in LDPE — role of conduction, injection and diffusion," in IEEE Transactions on Dielectrics and Electrical Insulation, vol. 27, no. 2, pp. 565-573, April 2020, doi: 10.1109/TDEI.2019.008328

[3]. B. Singh, A. J. J. Thomas and C. Chakradharreddy, "Effect of Voltage Waveforms of HVDC Converter Transformer on Lifetime Characteristics," in IEEE Transactions on Power Delivery, 2020 doi: 10.1109/TPWRD.2020.3033447

[4]. A. J. Thomas, I. C and C. C. Reddy, "A Method for Surface Voltage Measurement of an Overhead Insulated Conductor," in *IEEE Transactions on Instrumentation and Measurement*, vol. 70, pp. 1-8, 2021, Art no. 6000708, doi: 10.1109/TIM.2020.3021803