Fig. 8 indicates that the average contact angle can be calculated from the left-part angle and the right-part angle of the water droplet on the surface of a silicone-rubber post-insulator. By using the indicated values, the left-part angle of 118.87° and the right-part angle 114.79°, the average contact angle can be known to be 116.83° (Eq. 4). As it is larger than 90°, the silicone-rubber being used as the post-insulator material is classified into the group of hydrophobic material. The hydrophobic property of the silicone rubber makes the contact angle between the water and the insulator surface become smaller so that the resulted leakage current will be smaller than that on an insulator made of hydrophilic material.

Due to its contact angle which is larger than 90^o, an insulator made of silicone-rubber provides a good option to be considered for high-voltage applications. Another advantage offered by this type of insulator is an environmentally friendly fabrication process, because unlike the ceramic insulator it does not need high temperature process. The weight of a silicone-rubber insulator is also less than that of ceramic or glass insulator.

IV. CONCLUSIONS

Based on the calculation and analysis of the experiment results, some conclusions can be obtained.

The average contact angle of the silicone-rubber post-insulator of being 116.83° indicates that the type of insulator falls into the hydrophobic category, since the contact angle is greater than 90°.

In dry conditions, the increase in voltage value will be followed by the rise of the leakage current value proportionally, whereas in the wet conditions the higher the wetting rate, the leakage current increase will become more and more nonlinear with the increase of voltage value.

In dry conditions with a voltage increase of 5 kV in the range of 10-30 kV, the resulting leakage currents were 9.27, 14.27, 19.20, 24.27 and 29.37 μA subsequently, whereas under wet conditions with the highest wetting of 2.512 mm/min, the leakage current values were 18.5, 27.93, 45.57, 71.33 and 118.23 μA consecutively.

The application of silicone-rubber insulator in a 20-kV system offers a good performance (up to the highest wetting intensity of 2.512 mm/minute during the experiment) because the resulted energy losses were relatively small and the resulted leakage current level was below the maximum tolerable standard.

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