

Progress in optical PD detection for translucent and transparent HV cable accessories with improved fluorescent optical fibers

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In [1] we introduced sensitive and interference-immune optical PD measurements on HV cable accessories and presented first results. Since then, our investigations tried to cover all important aspects that lead to further improved sensitivity for optical PD detection and to applicability under harsh service conditions. In this paper, we report on the design of fluorescent optical fibers made of transparent silicone elastomers, which can withstand the electrical, thermal and mechanical stress within HV cable accessories in operation. Until now, stress cones can be made of qualified translucent silicone elastomers. To improve transmittance, however, new silicone elastomers with high transparency were investigated with respect to their characteristic properties, e.g. AC withstand voltage, electrical treeing behavior, thermal ageing, mechanical capabilities.

Sensitive optical PD detection proved also very useful for HVDC cable systems, where immunity to electromagnetic interference allows non ambiguous PD observations.

Besides, we will report on a new fiber-acoustic PD sensor that showed high sensitivity for PD detection and can be used in case of in-transparent insulation materials.

- [1] M. Habel, K. Vaterrodt, G. Heidmann, W. Habel, R. Vogelsang, W. Weissenberg, O. Sekula, D. Pepper, H. Emanuel, R. Plath, "Optical PD Detection in Stress Cones of HV Cable Accessories", Jicable 2011, paper B.8.4

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