

## **Characteristics of fulgurite-like structures under HV conditions: effects on electrical earthing systems**

### **ABSTRACT**

Fulgurites are natural tubes of glass formed by the fusion of silica sand or rock from a lightning strike. The fulgurites have been produced artificially in HV conditions in the past. Recent studies have found that fulguritic structures can be formed in some other materials, such as bentonite and cement, as well. These fulgurites can change the overall physical and electrical properties of the original materials. Thus, formation of fulgurites can modify the performance of electrical earthing systems, both ordinary and those improvised with backfill materials. This study investigates the fulgurite formation under alternating, direct and impulse current application. Bentonite and sand were tested under high voltage conditions. The type of fulgurites and their effects on electrical earthing systems were studied by analyzing the resistivity and permittivity of original materials and fulgurites. It has been found that fulgurites formation has a severe effect on the earth resistance of grounding systems.

**Keyword:** Bentonite; Fulgurites; High voltage; Impulse current introduction; Resistivity