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电机与电器

微放电发射电流法测量灭弧室真空度

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摘要: 真空灭弧室真空度的传统测试方法主要有磁控放电法及工频耐压法。磁控放电法需要使用磁场线圈,而 工频耐压法只能检出严重漏气的灭弧室。该文使用微放电起始电压Ud与发射电流起始电压Ue之比Ud/Ue测量灭弧 室的真空度。该方法不需要施加磁场,而是使用下述方法进行测量:将闭合的灭弧室触头强行拉开0.2~0.3 mm,然后在触头间隙上施加工频高电压,利用间隙微放电电流对触头表面进行老练,以除去触头表面原有的吸 附层,最后再测量间隙的微放电起始电压Ud与发射电流起始电压Ue。理论研究表明,真空灭弧室内的真空压强p 越小,Ud/Ue越大,故通过测量Ud/Ue的大小,就可以获得真空灭弧室内的真空度。文中在实验室的真空比对系 统上对不同管型灭弧室的Ud、Ue、Ud/Ue与真空压强p的关系进行了测试,测试结果表明,该文提出的Ud/Ue 法,其真空度测量范围能达到100~10-3 Pa。

关键词: 真空断路器 真空度 微放电 发射电流 测量

Measurement of Internal Pressure of Vacuum Tubes by Micro-discharge Emission Current

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Abstract: The traditional methods for measuring internal pressure of vacuum tubes of breakers are the magnetron and power frequency voltage withstand test. A magnet coil is needed by magnetron and 🕨 马乃祥 only very bad tubes can be picked out by voltage withstand test. A new method--the ratio of inception voltage Ud of micro-discharge to inception voltage Ue of emission current can be used to measure internal pressure p of vacuum tubes. By this method, internal pressure of vacuum tubes can be measured without using magnetic coil, but with following process: firstly, vacuum gap 0.2~0.3 mm is obtained by forced pulling the closed contacts, secondly, power frequency voltage is applied to the gap and inherent gas adsorption layers are polished by micro-discharge current, finally, the Ud and Ue of the vacuum gap is measured. Theoretical study shows that the bigger Ud/Ue is, the smaller p is. So by measuring the value of Ud/Ue, the value of p can be obtained. The relationships of Ud, Ue, Ud/Ue with p are measured in laboratory, the test results show that the measuring ranges of p can be 100~10-3 Pa by this new method.

Keywords: vacuum breakers internal pressure micro-discharge emission current measurement

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