

## ANALYSIS OF IONIC IMPURITIES IN ELECTRICAL ROTATING MACHINES INSULATORS BY ANALYTICAL TECHNIQUES

Ion V. POPESCU<sup>1,2</sup>, Claudia STIHI<sup>2</sup>, Cristiana RADULESCU<sup>2</sup>,  
Ioana Daniela DULAMA<sup>2</sup>, Iulian BANCUTA<sup>2</sup>, Anca GHEBOIANU<sup>2</sup>,  
Mircea IGNAT<sup>3</sup>, Gabriela TELIPAN<sup>3</sup>, Bogdan VARATICEANU<sup>4</sup>,  
Gh. Valerică CIMPOCA<sup>1</sup>, Elena Daniela CHELĂRESCU<sup>5</sup>

**Abstract.** *The insulation used in electrical rotating machines is a major component that influences their operation parameters. It is therefore essential to identify the methods of investigation and new technological processes to improve quality of the insulation. Traces of transition metals have been found in the insulation of cables PE. These transition metals causes degradation of insulation, affect its insulating properties and can lead to undesired electrochemical processes under the electrical stress factor. Traces of transition metals in insulator can be determined only by means of atomic and nuclear techniques of high sensitivity and precision. In this paper are presented some analytical techniques that can be used in the analysis of insulators in order to establish the most suitable method to determine the concentrations of ionic impurities. By technique Inductively Coupled Plasma Mass Spectrometry – ICP-MS, were identified and quantitative determined in insulator the following chemical elements: Cu, Pb, Zn, Cr, Cd, Al, Ni, Co, Fe and Mn.*

**Key words:** insulator, stress factor, methods, electrical rotating machines

### 1. Introduction

The insulation used in electrical rotating machines is a major component that influences their operation parameters. It is therefore essential to identify new methods of investigation and new technological processes to improve quality of the insulation. Traces of transition metals have been found in the cables insulation. These transition metals can produce degradation of highly oxidative ionic impurities in insulation and affect its insulating properties and can lead to undesired electrochemical as a electrical stress factor. Traces of metal insulator transition can only be determined by atomic and nuclear techniques of high precision and high sensitivity. Therefore it is important to make a short presentation of analytical methods for determining the most suitable technique,

---

<sup>1</sup>Academy of Romanian Scientists, Splaiul Independentei nr. 54, 050094 Bucuresti, Romania.

<sup>2</sup>Valahia University of Târgoviste, Multidisciplinary Research Institute for Science and Technologies, Târgoviste, 130082, Romania.

<sup>3</sup>National Institute for R&D in Electrical Engineering ICPE-CA, Romania.

<sup>4</sup>Institutul de Cercetari Electrotehnice ICPE SA, Bucuresti, Romania.

<sup>5</sup>National Institute for Physics and Nuclear Engineering, Măgurele, Romania.

---