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ELEMENTAL ANALYSIS OF ENVIRONMENTAL AEROSOL IN GABORONE, BOTSWANA

T.S.Verma, Shibu K.John and P.V.C.Luhanga

Department of Physics, University of Botswana, Pvt Bag 0022, Gaborone, Botswana. E-mail address: vermat@mopipi.ub.bw

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Abstract

The aim of the present work was to monitor the elements present in the atmospheric particles in Gaborone, Botswana. Botswana is a land locked country in southern Africa surrounded by Namibia to the west, South Africa to the east and south and Zambia and Zimbabwe to the north. Botswana is rich in minerals. The minerals cobalt, copper and nickel are found in Selebi-Phikwe area and gold and nickel in Francis town and soda ash in Sowa. Many researches have been carried out to study the elements present in the atmosphere [M. Zunckel et al 2000, M. Koaak et al 2004, F. Almomari et al 1997]

The present attempt was conducted at the Department of Physics, University of Botswana wherein experimental facilities for monitoring and analysis of airborne particulate exist. The Environmental Scanning Electron Microscope stubs were used to collect the atmospheric particles. The stubs were placed near a busy road passing close to the University of Botswana. The stubs were analyzed using Environmental Scanning Electron Microscope (ESEM) to detect the element concentration in the particles.

The number of occurrence of elements in the 23 stubs during the experimental period is determined. Figure1 below shows the number of occurrence of the elements in the particles detected during the experimental study.

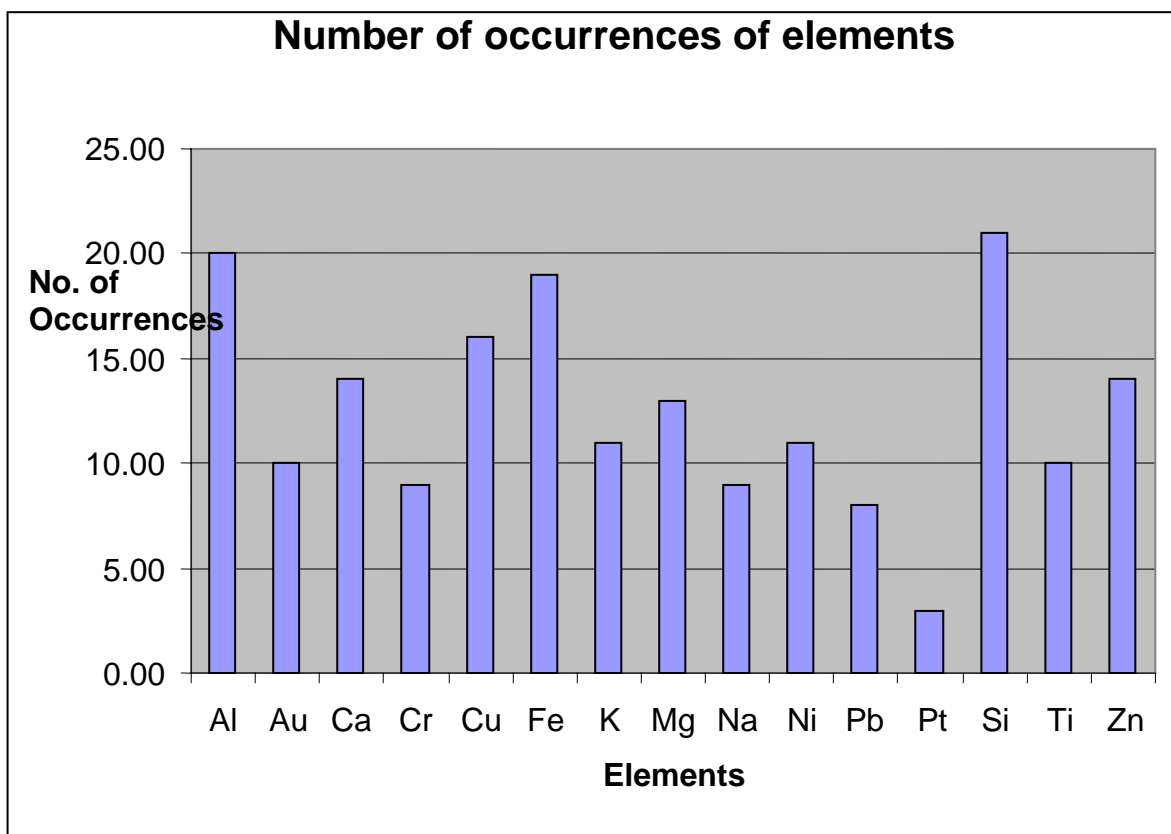


Figure 1: The graph showing the number of occurrences of elements.

The results show that the elements occurred 50% or more are Al, Si, Fe, K, Ca, Mg, Zn, Cu, and Ni. The most frequently occurred element is silicon and the least frequently occurred element is platinum.

The maximum weight percentage of each element in the particle detected is also calculated. Figure 2 below shows the maximum weight percentage of the element detected in a particle during the experimental study. During the course of experiment, some particles observed had very high concentration of an element. For example, lead concentration in a particle was about 90% and Gold concentration in another particle was about 98%

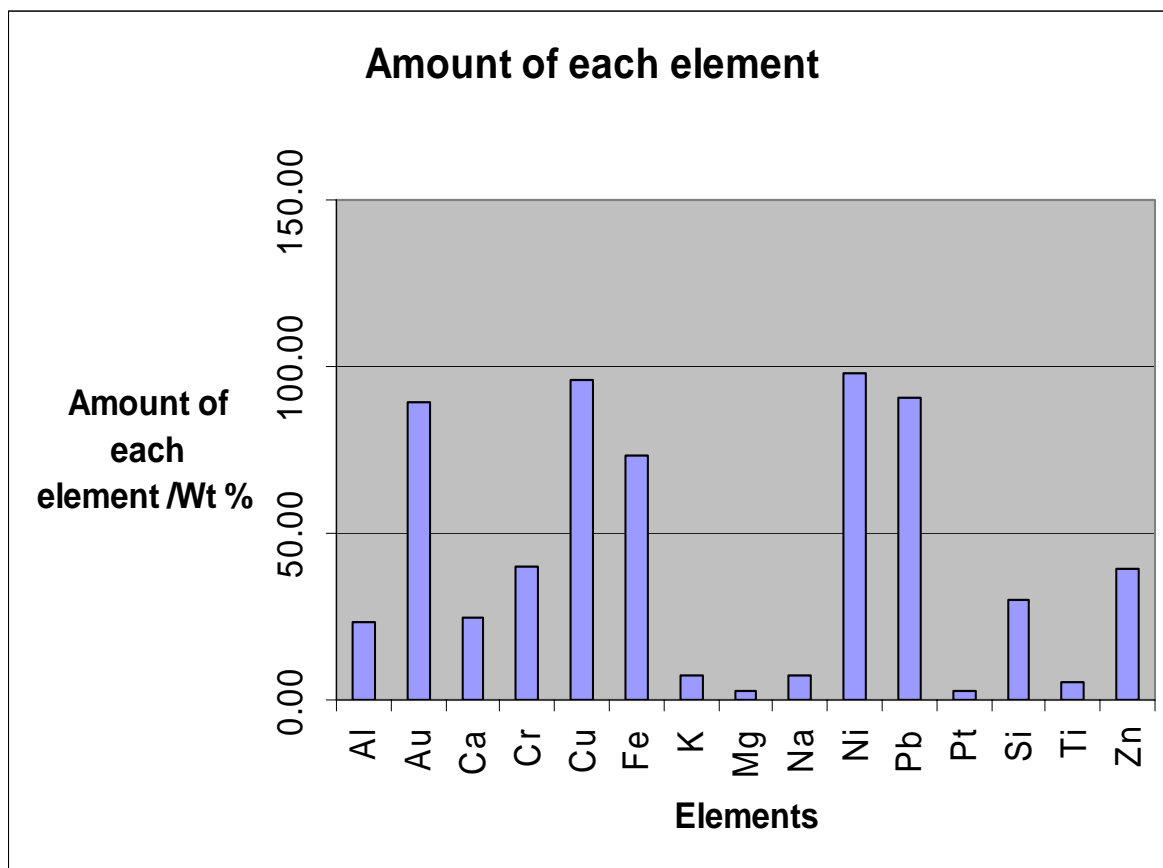


Figure 2: The graph showing the amount of each element detected in the particle.

Our measurements reveal that the elements which had an amount more than 90% are copper, lead, nickel and gold.

This study is on going and additional results will be presented at the conference.

References

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