

## Impedance Spectroscopy of organic azo compound under pH variation

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**Abstract** – Methyl Red 2-[4-(dimethylamino) phenylazo] benzoic acid (MR) is a typical aromatic azo compound used extensively as an acid/base indicator due to colour change with varying pH. The absorption bands of MR in basic environment it suffers a red shift of approximately 95 nm comparing with band absorption to acid pH values. The impedance spectroscopy, in the region of low frequencies the MR under acid pH = 1, 6 presents high values of impedance that indicate a behavior of carriers charges.

Organic materials have been intensively investigated due to their wide range of applications in electronics technology [1], are widely used to develop many optoelectronics devices such as large area solar cell, photodetectors, field effect transistor, etc. The advantages of using organic materials in devices fabrication over a large area on flexible substrate from its solution by simple processing techniques, excellent film forming properties, facile color tenability and adequate mechanical properties [2]. Methyl Red 2-[4-(dimethylamino) phenylazo] benzoic acid (MR) is a typical aromatic azo compound used extensively as an acid/base indicator due to colour change with varying pH [3].

The Figure 1 shows the data of the spectra absorption of the Methyl Red under pH variation; we observed that the absorption bands of MR in basic environment it suffers a red shift of approximately 95 nm comparing with band absorption to acid pH values. In Figure 2 the graphs of the Argand type, shows the behavior for the MR under variation of pH characterized by impedance spectroscopy, in the region of low frequencies the impedance of MR under acid pH = 1,6 presents high values of impedance, not being possible the complete visualization of the semicircle that would indicate a behavior of carriers charges in the solution of MR under pH = 1,6 this behavior can be explained had to the strong capacitive character in low frequencies, for the solutions of pH = 2,5, 3,1 and 5,4 we observe the reduction of the impedance  $Z''$  e formation of the semicircles that correspond to a small polarization of electrodes. These preliminary studies have for objective to investigate the properties of azo compound to development of the volumetric junctions to fabrication of the conversion devices.

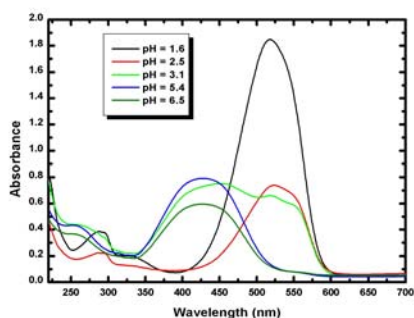


Figure 1: Absorbance of Methyl Red under pH variation.

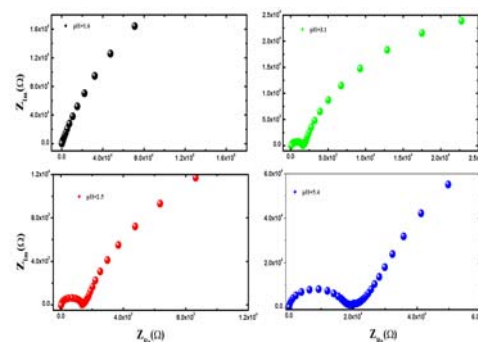


Figure 2: Impedance spectroscopy for Methyl Red under pH variation, Argand graph.

### References

- [1] M. Jones and B. Castle. Journal volume, number (year) page 1 – page 2.
- [2] G. William, V. Hilton and F. Becker, title of patent, US Patent xx,yy,zz (year).
- [3] H. Andrade and T. Marques. Title of paper in Proceedings of the conference, place, date, media of publication.