

## ***Abstract***

In this work, Laser-induced plasma spectroscopy (LIPS) was employed to generate plasma in air at atmospheric pressure from a carbon sample by using a passively Q-switched Nd:YAG laser (334.7mJ, 1064 nm with 9 ns pulse duration, 37MW peak power ,the power density of the laser was  $6.4 \times 10^6$  Mw/cm<sup>2</sup> ). optical spectrum analyzer with 150 pm optical resolution for spectrum range (320 nm - 740 nm), was used to detect and analyze plasma emission lines of the carbon element and study the plasma properties and determine the carbon isotope to its importance in medical and industrial applications, by the isotopic shift(0.03 nm). The wavelength and the intensity of carbon used is (C I 482.6796 nm, 0.0047759) where the plasma temperature is (6955.001 k) and the electron density  $N_e = 2.259 \times 10^{15}$  cm<sup>-3</sup> , and the wavelength of carbon isotope <sup>13</sup>C is (516.033nm) ,where the plasma temperature is (6122.5 k) and the electron density  $N_e = 1.7 \times 10^{15}$  cm<sup>-3</sup> .