

In this article we will present an attempt to measure the Stark broadening parameter of the Zn I-line at 636.23 nm utilizing the optical emission spectroscopy (OES) technique, taking into consideration the possibility of existence of self absorption. This method is standing on comparison of the Lorentzian FWHM and spectral line intensity of the unknown Stark broadening parameter line (Zn I-636.23 nm—in our case) to a well known Stark parameter line (e.g. Zn I-lines at 472.2, 481 and 468 nm) at a reference electron density of $2.7 \times 10^{17} \text{ cm}^{-3}$ and temperature of 1 eV. We have utilized the emission spectral data acquired from well diagnosed plasma produced by the interaction of Nd: YAG laser at wavelength of 1064 nm with ZnO nanomaterial target in open air. The results indicates that the Stark broadening of the Zn I-line at 636.23 nm is centered at $5.06 \pm 0.03 \text{ \AA}$ with a 25% uncertainty at the given reference plasma parameters. The knowledge of the Stark broadening parameter of the 636.23 nm line may be important in the diagnostics of the laser plasma experiments especially in the absence of the H α -line.