Development of Spark Emission Spectrometer to Identify an Alloy

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Spark optical emission spectrometer (OES) is a widely used technique in identifying alloy compositions of metals. Based on the OES principle, a low-cost spark, portable and fully automated spark optical emission spectrometer was developed. A 1000kV ultra-high voltage arc generator coil module was used as the excitation source and a CMOS (complementary metal-oxide semiconductor) image sensor was used as the spectral detector in this spark OES. Data collection and interfacing was done through a Raspberry Pi Single-board Computer. Analysis of wavelength and intensity data were performed using an algorithm coded in python programming language. The program presents the alloy elements and their quantities. Three main factors that limits the precision and accuracy of results were identified as the excitation source, the resolving powers of the spectrometer and the electronic noise characteristics of the systems.