List of Tables

Table 1 A comparative evaluation of different elemental analytical techniques........ 19
Table 2 National Institute of Standards and Technology (NIST) atomic spectra database levels data for carbon atom.......................................................... 39
Table 3 Major equipments/components used for developing a sensitive LIBS system ....................................................................................................... 55
Table 4 Spectrum reproducibility check for laser induced copper plasma. ............ 82
Table 5 Distances to be moved towards focusing lens (FL20cm here) in order to get different laser spot sizes................................................................. 87
Table 6 Energy levels of copper lines of interest ................................................ 97
Table 7 Elemental concentrations (wt %) in three certified samples of Ni2 (Cr, Mo) alloys........................................................................................................ 118
Table 8 Wavelength, lower and upper energy levels, upper level degeneracy, transition probability for the Cu I and Cu II emission lines used in this work ........ 120
Table 9 Plasma temperatures and electron density as a function of delay time of the detector relative to the onset of the laser pulse on the sample................ 121
Table 10 Atomic emission lines used for quantitative analysis, along with the related spectroscopic parameters.......................................................... 127
Table 11 Slope (m) and linear regression coefficient (R^2) of the calibration curves of Cr at five values of the detector gate delay using the three certified samples of Ni alloys........................................................................................................ 129
Table 12 Correlation of the LIBS determined concentration ratio Cr/Ni with its certified values..................................................................................... 131
Table 13 Values of T, n_e, nZn I/nCu II and nCu II/nCu I in the LIBS plasma determined from the LIBS spectral line intensities as experimental results........ 133
Table 14 Values of Zn and Cu concentrations obtained from the CF-LIBS analysis along with their certified values and accuracy errors of the LIBS analytical results........................................................................................................ 134
Table 15 Excess emission signal from the elements of our interest....................... 153
Table 16 LIBS intensity of elements in blank soil............................................... 159
Table 17 Comparison of LIBS results with AAS for elemental analysis in blank soil ........................................................................................................... 160
Table 18 Correlation of the LIBS determined concentration ratio Mn/Si with its certified value and the corresponding uncertainty of four Mn-doped glass samples using the calibration base method........................................... 169
Table 19 Sample composition and measurement parameters for LIBS investigations. ........................................................................................................ 174
Table 20 Results of nonlinear regression of measured intensity as a function of distance for copper target

Table 21 Results of nonlinear regression of measured intensity as a function of distance for zinc

Table 22 Results of nonlinear regression of measured intensity as a function of distance for iron.