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EQUILIBRIUM COMPOSITION OF PLASMA OBTAINED BY LASER ABLATION OF GLASS

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Abstract. In addition to standard glass analysis techniques, laser induced breakdown spectroscopy (LIBS) emerged in past decades as a powerful tool for glass analysis. Calculation of the composition of plasma created by laser ablation of common glass sample is performed, assuming the existence of the local thermodynamical equilibrium. Elemental composition of glass (in molar percentages) is assumed to be the following: 60.7 % oxygen, 27.6 % silicon, 9.59 % sodium, 0.78 % aluminum, 0.62 % sulfur, 0.51 % potassium and 0.32 % calcium. Plasma is considered to be under the constant pressure of 1 atm, while the considered temperature range was from 5,000 to 20,000 K. The possibility of finding elements in multiple ionization stages is taken into account. Continuum lowering is not accounted at this level of calculation, while mixing with background gas is neglected. Obtained results are expected to be very useful in the practical analysis of glasses, in terms of spectrum synthesis based on calculated compositions.

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