

Chemistry in the laser-induced plasma

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Since the first uses of LIBS, it is known that the laser induced plasma, as many other atom reservoirs, is a dynamic system that evolves rapidly to stable species after the end of the laser pulse. LIBS of metallic targets, which is the best established body of knowledge in this area of research, reveals the existence of a limited number of reactions between the excited and ionized atoms and atmospheric oxygen. The oxides formed may be used for characterizing the original sample, as for instance using the recently demonstrated application of LIBS for isotopic analysis at atmospheric pressure. The case of LIBS of organic compounds is much more complex. Recent investigations reveal that reactions in the plasma between fragments formed by dissociation of the original compound and by reactions of these fragments with the gas surrounding the plasma are extensive. While these reactions tend to complicate the spectroscopy and its interpretation, the products formed and the way they interact can be exploited for assigning the identity of the original compound. In this talk, a discussion of the several factors affecting the plasma chemistry of a number of molecular compounds will be presented. Factors influencing the formation of emitting species and some applications in the chemical analysis of organic samples will be discussed.