Directional freezing of suspension as a new approach to increasing the efficiency of laser-induced breakdown spectroscopy in elemental composition studies.

Shevchenko M.A.[1,@] **and Voronova V.V.**[1]

[1] Lebedev Physical Institute of the Russian Academy of Sciences, Leninsky Avenue 53, Moscow, 119991, Russia

[@] mishev87@mail.ru

A new method for enhancing Laser-Induced Breakdown Spectroscopy (LIBS) [1] signal intensity in elemental analysis of nano- and submicron particles in suspension has been demonstrated. The method is based on the displacement of particles by a solidification front during the process of directed freezing of a liquid [2]. As a result, a densely packed layer of particles is formed on the surface, which leads to an increase in the intensity of plasma emission when interacting with laser radiation. It is shown that the morphology of the resulting layer of particles can be controlled by changing the freezing configuration. The results of increasing the sensitivity of the LIBS method for various suspension freezing configurations, as well as the influence of particle concentration on the efficiency of the process are presented.