

(LOD) of our LIBS system for Cr element in capsule is lower than 1 ppm. LIBS analysis technology is well suited for determining chromium content in capsules.



Fig. 1 The capsule after laser ablated.

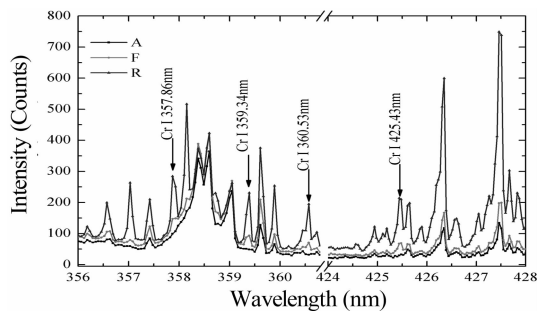


Fig. 2 The lines of Cr I.

4 - 4 Double-pulse Laser-induced Breakdown Spectroscopy in Aluminium Sample

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In the recent years, a great interest in double-pulse LIBS (DP-LIBS) has been raised as a consequence of its better performance, in terms of signal enhancement, as compared to single-pulse LIBS (SP-LIBS)^[1]. In our experiments, a series of DP-LIBS experiments on aluminium samples were performed with collinear DP-LIBS, orthogonal reheating DP-LIBS and orthogonal preablation DP-LIBS.

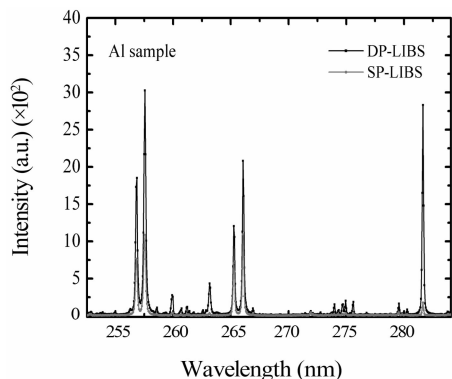


Fig. 1 Comparison DP-LIBS result with SP-LIBS result.

The optimum delay time between laser and spectrometer was found to be 400 ns to obtain good SNR from single-pulse LIBS results. The parameters such as the delay time between laser pulses and laser wavelength combination were investigated to find maximal enhancement factor of DP-LIBS. Comparing with SP-LIBS using the first ablation laser beam, 11~73 fold enhancement was observed using 1064 nm 266 nm sequence collinear DP-LIBS and 2.5~11 fold enhancement was observed using 266 nm 1064 nm sequence orthogonal reheating DP-LIBS. Fig. 1 shows a DP-LIBS result using 532 nm laser with 15 mJ pulse energy and 355 nm laser with pulse energy 50 mJ with orthogonal reheating configuration. The time delay between laser pulses was 60 ns. 19 times intensity enhancement of Al II(281.6 nm) line was observed. With the help of emission images of plasma, the main enhancement mechanism of our experimental results was explained qualitatively.

Reference

[1] A. De Giacomo, M. Dell'Aglio, D. Bruno, et al., Spectrochimica Acta, B63(2008)805.